



Volume 9.—No. 1.

MILWAUKEE, MAY, 1880.

Terms: \$1.00 a Year in Advance.
Single Copies, 10 Cents.

ATTENTION.

MILLERS' NATIONAL ASSOCIATION. THE CALL.

PRESIDENT'S OFFICE,
ST. LOUIS, APRIL 15, 1880.

To the Members of the Millers' National Association: The next annual meeting of the Millers' National Association will be held in Cincinnati, commencing May 31, 1880.

In connection with this meeting there will be a grand International Exhibition of Milling and Mill Machinery. This Exhibition will embrace a display of every machine used in milling, every product of the mill, besides samples of grain raised in every section of the United States. I would therefore earnestly impress upon all members of the Association, not only the necessity of being present, but also of making some show in the Exhibition, either in the way of grain or flour, or both. As the Exhibition will be held under our auspices, every member is interested in making it not alone a success but an event that will reflect honor upon the Association.

Presidents of State Associations should take immediate steps to make such displays by States as will be creditable to their Association.

All railroads centering in Cincinnati will make special rates, of which the Local Committee will notify members in due time.

Special hotel arrangements have been effected. The Grand Hotel, Hotel Emery, Burnett and Gibson, will entertain members at \$2 per day.

The Executive Committee will meet at the Grand Hotel, which will be the headquarters of the Executive Officers, on Monday, May 31, and anyone who desires to present to the convention, papers on special subjects (and the officers of the Association will be glad to have any number of them presented), will be placed by them before the committee. And if they cannot be present in person, send them at any time to any member of the committee, or to the Secretary, and they will receive careful attention and be assigned a day.

It is believed that every manufacturer of milling machinery in the United States, and a great number from Europe will be represented at the Exhibition. No miller can afford to be absent from this meeting and Exhibition, the first of the kind ever held in the world.

GEORGE BAIN, President.

SEVENTH ANNUAL CONVENTION AT CINCINNATI, OHIO, JUNE 1, 1880—ORDER OF BUSINESS.

1. Opening of the convention, 11 o'clock a. m.
2. Report of Committee on Credentials.
3. Proceedings of last convention.
4. Enrollment of members.
5. Official report.
6. Call of Standing Committees and filling vacancies.
7. Appointment of Committee on Nomination of Officers.
8. Reports of Standing Committees.
 1. State Organization.
 2. Transportation.
 3. Insurance.
 4. Grading and Inspection.
 5. Patents.
 6. Milling and Improved Methods.
 7. Mill Machinery.
 8. Grain for Milling.
 9. Brands and Trade Marks.
 10. Millers' School or College.
9. Reports from Special Committees.
10. General business.
11. Reports of Committee on Nominations and Election of Officers for the ensuing year.

STANDING COMMITTEES.

- 1.—State Organization.—D. B. Kirk, Chairman, St. Louis, Mo.; W. Hibbard, Grand Rapids, Mich.; J. O. Morris, Baltimore, Md.; O. W. Baldwin, Ottawa, Kas.; Robt. Colton, Belle Fontaine, Ohio.
- 2.—Transportation.—J. A. Hinds, Chairman, Rochester, New York; P. A. Small, York, Pa.; J. B. A. Kern, Milwaukee, Wis.; John Crangle, St. Louis, Mo.; A. A. Taylor, Londonville, Ohio.
- 3.—Insurance.—C. C. Washburn, Chairman, Minneapolis, Minn.; John Schuette, Manitowish, Wis.; F. Schumacher, Akron, Ohio; E. F. Kreider, Jacksonville, Ill.; J. F. Roll, Ithaca, Neb.
- 4.—Grading and Inspection.—Thomas Hermanow,

Chairman, Chicago, Ill.; H. Williams, Houston, Minn.; Geo. Motley, Rochester, New York; Charles Mangel, Milwaukee, Wis.; R. L. Thompson, Terre Haute, Ind.

5.—Patents.—Alex. H. Smith, Chairman, St. Louis, Mo.; J. A. Christian, Minneapolis, Minn.; C. H. Seybt, Highland, Ill.; J. A. Hinds, Rochester, New York; J. D. Hayes, Detroit, Mich.

6.—Milling and Improved Machinery.—E. V. White, Chairman, Minneapolis, Minn.; J. B. A. Kern, Milwaukee, Wis.; Joseph F. Gent, Columbus, Ind.; H. L. Hilday, Cairo, Ill.; J. B. Ficklin, Fredericksburg, Va.

7.—Mill Machinery.—Nic. Ellis, Chairman, Evansville, Ind.; Robt. Tyson, Baltimore, Md.; Homer Baldwin, Youngstown, Ohio; D. E. Roberts, Maysville, Ky.; J. F. Woodbury, Marshalltown, Iowa.

8.—Grain for Milling.—Walter A. Green, Chairman, Milford, Wis.; J. A. Kimberly, Neenah, Wis.; C. D. Smith, Lincoln, Neb.; I. M. Norton, Chicago, Ill.; L. Fletcher, Minneapolis, Minn.

9.—Brands and Trade Marks.—Robert Atkinson, Chairman, Ottawa, Kansas; David Keifer, Covington, Ky.; H. S. Osborne, Quincy, Ill.; Phil. Hazali, Richmond, Va.; Wm. Lea, Wilmington, Del.

10.—Millers' School or College.—J. R. Serrin, Chairman, Ladore, Iowa; A. Z. Schock, Selinsgrove, Pa.; W. G. Gage, Fulton, N. Y.; H. B. McAtee, Baltimore, Md.; G. D. Thomas, Gallatin, Montana.

11.—General Reference.—D. R. Sparks, Chairman, Alton, Ill.; J. J. Smouffer, Cedar Rapids, Iowa; David Gibson, Indianapolis, Ind.; H. G. Smith, Sacramento, Cal.; Henry Rodee, Ogdensburg, N. Y.

12.—Credentials.—D. B. Merrill, Chairman, Kalamazoo, Mich.; J. A. Dewar, Kansas City, Mo.; J. H. Gambrell, Frederick City, Md.; Henry Stanley, St. Louis, Mo.; H. A. Hayden, Jackson, Mich.

*At the last annual convention, held in Chicago, May, 1879, the Committee on Mill Machinery closed their report with the following resolution, which was unanimously adopted:

Resolved, "That the Committee on Mill Machinery to be appointed for the ensuing year be instructed to use all efforts to obtain full information concerning any valuable improvements in any branch of milling machinery, and report in detail to the next Convention, and that the members of this Convention are earnestly recommended to give this Committee all possible assistance by informing them of the exact result of any successful experiments that may come under their observation."

Millers' International Exhibition.

LIST OF EXHIBITORS UP TO APRIL 27, 1880.

Eureka Mfg. Co., Becker wheat brush, Gault's combined brush and smut, Rock Falls, Ill.

Bemis Bros. & Co., bags and sacks, St. Louis, Mo.

Wolfe & Haymaker, middlings purifiers, Allentown, Pa.

Nordyke & Marmor Co., complete mill and mill supplies, Indianapolis, Ind.

Simpson & Gault, complete mill job, Cincinnati, O.

Jas. Jones, portable mills, Louisville, Ky.

W. & N. Thayer, middlings purifiers, etc., Westerville, Ohio.

Joliet Mfg. Co., separating corn sheller, Joliet, Ill.

Stilwell & Bierce, turbine water wheels, Dayton, Ohio.

M. Deal & Co., smutters and separators, Bucyrus, Ohio.

Richmond City Mill Co., milling machinery and mill supplies, Richmond, Ind.

Thos. McFesley, diamond millstone dressing machines, Union City, Ind.

John Hafner, coil springs, models and model mills, Pittsburg, Pa.

Munson Bros., portable mills, mill stones, mill machinery and mill supplies, Utica, N. Y.

Lane & Stevens, separators, graders, scourers, smutters, etc., Burlington, Iowa.

H. W. Caldwell, grain and flour conveyors, St. Louis, Mo.

A. N. Wolf, middlings purifiers, middling mills, water wheels, etc., Allentown, Pa.

A. B. Bowman, pulleys, wheat heaters, shafting, hangers, etc., St. Louis, Mo.

Harvard & Leas, milling machinery, Moline, Ill.

A. B. Wren & Son, grain, etc., Cincinnati, O.

H. & L. Chase, bags and bagging, St. Louis, Mo.

Knowlton & Dolan, grinding mills, middling mills, wheat and corn mills, Loganport, Ind.

F. Lankenheimer, brass engine fittings, lubricators, oil cups, Cincinnati, O.

Downton Middlings Purifier Co., purifiers, St. Louis, Mo.

N. Bassett & Co., sifting machines, etc., New York City.

C. C. Phillips, milling machinery, Philadelphia, Pa.

Cookie Separating Co., separators, Milwaukee, Wis.

Milwaukee Middlings Mill Co., wheat and middling mills, Milwaukee, Wis.

Teter & Allen, middlings purifiers, elastic millstone setting, etc., Philadelphia, Pa.

Wm. A. Harris, Corliss engine, Providence, R. I.

Buckeye Engine Works, engine, Salem, O.

C. H. Brown & Co., engine, Fitchburg, Mass.

Wheelock Manufacturing Co., engine, Wooster, Mass.

Stearns Mfg. Co., engine, Erie, Pa.

Bell Telephone Co., Cincinnati, O.

John Turnbull, Jr., piston packing, Glasgow, Scotland.

Kellan & Waterman, steam regulators, Detroit, Mich.

Shuttleworth & Morse, Springfield, Erie Co., N. Y.

Huddart & Rigdon, scales, Cincinnati, O.

Smith, Vail & Co., steam pumps, Dayton, O.

Raymond Bag Co., bags, Cincinnati, O.

Minnesota Millers' State Association, mill products, etc., Minnesota.

Turner, Vaughn & Taylor, rolling screen grader, separator, middlings purifiers, etc., Cuyahoga Falls, Ohio.

W. G. Hyndman & Co., sheet iron roofing, Cincinnati, Ohio.

Chisholm Bros., middlings mills, bran machines, etc., Chicago, Ill.

Wm. Carr & Son, automatic grain weigher, Yellow Springs, Ohio.

Jacob Lampert, bran cleaner or scourer, Stevens Point, Wis.

Marshall, Graves & Co., circular iron proof staffs, Dayton, Ohio.

A. Hunter, middlings purifiers, Chicago, Ill.

N. P. Bowsher, Lincoln, Ill.

Campbell Creek Coal Co., Cincinnati, O.

Star Wheat Heater Co., wheat heaters and attachments, Ligonier, Ind.

Smith & Osborne, electric middlings purifiers, New Haven, Connecticut.

Brehmer Bros., millstone ventilation, Philadelphia, Pa.

Reel & Seyler, middlings purifiers, Cedarville, Ill.

Estate of E. T. Harrison, standard corn and flour mills, New Haven, Conn.

Gaff, Fleischman & Co., compressed yeast, Cincinnati, Ohio.

Stout, Mills & Temple, turbine wheels, etc., Dayton, Ohio.

D. Kirby, sifting and mixing machines, Cincinnati, O.

Homer Baldwin, flour and wheat, Youngstown, O.

Stedman & Co., middlings purifiers, corn shellers and cleaners, Aurora, Ind.

F. H. Kane, colliery belt works, Cincinnati, O.

Daniel L. Braucher, scourer and separator for grist mills, Lincoln, Ill.

W. P. Clifford & Co., grain separator and grader, scourer and smutters, wheat finishing and grading machines, Indianapolis, Ind.

Kreider, Campbell & Co., middlings purifier, smut machines, grinding mill, Philadelphia, Pa.

Chas. A. Gump, bolting cloth, Dayton, O.

Dufour & Co., bolting cloth, Thal, Switzerland.

Case Mfg. Co., middlings purifiers, turbine water wheels, etc., Columbus, Ohio.

Three Rivers Mfg. Co., millstone dressers, Three Rivers, Mich.

Deal Bros. Mfg. Co., Bucyrus, O.

Iowa Millers' State Association, Iowa.

The Currier Middlings Mill Co., Oskaloosa, Iowa.

Geo. W. McNeil & Sons, smut machine, Akron, Ohio.

John Fiechter & Sons, flour mill machinery, Liverpool, England.

Stein & Wallace, oat-meal, Sterling, Ill.

Memphis Exchange, samples of all kinds of grain, St. Louis, Mo.

Gratiot Bros., wheat heaters, Plattville, Wis.

Howes, Babcock & Co., separators, Silver Creek, N. Y.

C. N. Bigelow & Co., bagging and sacks, New York City.

John Stanton, stencils, stencil paint and brushes, Cincinnati, O.

Huntley, Holcomb & Heine, bolting cloth, Silver Creek, N. Y.

C. Duwell, flour, corn-meal, grain and malt dryer, Cincinnati, O.

Thos. Bradford & Co., portable mills, Cincinnati, O.

E. P. Allis & Co., milling supplies, Milwaukee, Wis.

Bradford Mill Co., complete mill, Cincinnati, O.

John T. Mays & Sons, general line of mill machinery, Buffalo, N. Y.

Heidegger & Co., bolting cloth, etc., Zurich, Switzerland.

Arkell & Smith, flour sacks, etc., Canajoharie, N. Y.

Union Iron Works, corn shelling and corn and wheat cleaning machinery, Decatur, Ill.

D. D. & Z. C. Brewster, buck-wheat refiner, Unadilla, N. Y.

Rathbun Bros., reel bolting chests to show working of Rathbun patent flour bolt attachment, Rochester, N. Y.

W. H. Palmer, millstone furrow staff, Maysville, Kentucky.

Empire Middlings Purifier Co., middlings purifiers, Watertown, N. Y.

Chas. Bowers & Co., burr dresser, Youngstown, O.

Victor Heater Co., wheat heaters and ending stone, Minneapolis, Minn.

Phoenix Foundry and Machine Works, flour bolting attachment, Terre Haute, Ind.

Lawrence Roth, mill picks, Cincinnati, O.

D. M. Richardson, wheat scourers, polishers and separators, Detroit, Mich.

Ferdinand Schumacher, oat-meal, hominy, etc., Akron, Ohio.

T. F. Rowland, elevator buckets, Brooklyn, N. Y.

Wm. Richmond, bran dusters, separators, brush machines, Lockport, N. Y.

Coombs & Gray, bolting mills, Memphis, Ind.

Geo. T. Smith, Middlings Purifier Co., middlings purifiers, millstone shaft and dust deposit machine, Jackson, Mich.

H. Pestalossi, bolting cloth, New York, N. Y.

C. W. Withenbury, grate bars for furnaces, and burr dressing machine, Cincinnati, O.

Putnam, Hooker & Co., seamless cotton and jute bags, Cincinnati, O.

Wm. H. Geobegan, middlings purifiers, Paris, Ill.

E. P. Allis & Co., Reynolds-Corliss engine, Milwaukee, Wis.

Joseph Dixon Crucible Co., Dixon's graphite lubricators and belt grease, Jersey City, N. J.

D. Friese, friction clutch pulley, New Haven, Conn.

W. H. Hinkle & Co., Minneapolis, Minn.

Maurice Gandy, Liverpool, England.

John C. Higgins, Chicago, Ill.

Wm. Lehmann, adjustable millstone bottom staff, Milwaukee, Wis.

Henderson & Bestler, milling machinery, Norristown, Pa.

Exhibition Notes.

CINCINNATI, April 25, 1880.

Editor United States Miller:—A mistaken idea is held by some, that the hotels of Cincinnati are going to take undue advantage of the immense crowds which will be attracted to the Millers' Exhibition, and will in consequence charge exorbitant rates for accommodation. Such is not the fact. Reduced rates have been made with all the hotels, and arrangements are being made, so that satisfactory rates will be charged to visitors by the different railroads. The hotel accommodations of Cincinnati are ample. There are five leading hotels and eight first-class ones, which will provide for all. No one need stay from the Exhibition for fear of not being accommodated.

BOARD OF COMMISSIONERS,
Millers' Inter. Exhibition.

CINCINNATI, April 26, 1880.

Editor United States Miller:—Dear Sir:—The

following letter has been received by the Board of Commissioners, and they respectfully request you to give it space in your columns. The Board will receive and place on exhibition all flour sent them as Mr. Davis proposes to send his:

MR. E. H. HUNTINGDON, Cincinnati, Ohio.

Dear Sir:—Enclosed I hand you entry slip. Of course I cannot expect a premium, but I think, and consider it a duty of American millers to contribute at least one barrel of flour for the enterprise. Very respectfully,

WM. H. DAVIS,
Glasford, Ill.

NOTICE TO EXHIBITORS.—All exhibits are expected to be in position, on the Saturday before the opening of the Exhibition, or in other words, on the 29th of May. In the case of running machinery, every machine should be placed in position, and run, three days before the opening of the Exhibition. Articles intended for exhibition may be sent to the buildings at any time after the 3rd day of May, and the Commissioners urge the exhibitors to ship their goods as soon after the 3rd as possible. The Exhibition will open on Monday, May 31, and close Saturday, June 26. Signed,
SPACE COMMITTEE, Millers' Inter. Ex.

The medal which Mr. Howard Lockwood, of New York, proposes giving will be presented under the following rule: "This gold medal shall be awarded by a Committee of three (3) disinterested and competent, jurors to be appointed by the Board of Commissioners of the Millers' International Exhibition, to the machine, or improvements in machines, of greatest merit, invented within the past ten years, and which shall mark extraordinary progress and utility in its application to the milling or grain interests, to be exhibited in successful operation during the Exhibition." Exhibitors who propose entering for competition for this medal should notify the Commissioners of the fact.

THE VIENNA BAKERY AT THE EXHIBITION.

A large Vienna bakery, erected at a cost of \$4,500, will be in operation in Horticultural Hall, during the Exhibition. It is proposed to officially test the premium flour by baking. Millers who desire to have their flour baked can have it done at a small cost, and no doubt many will take advantage of this.

Why Uncle Phil Broke the Sabbath.

There are a great many people in their religion, that remind me of "Uncle Phil," a pious old darkey of the old times in Texas.

Well, Phil was a fervent Christian, with a great gift of prayer. He attended all the Saturday night prayer-meetings on the neighboring plantations, and could pray louder and longer than any of the brethren. But Phil had one weakness, he dearly loved money, and, different from the negro generally, loved to hoard it.

Near by us lived a man who, not troubled by any scruples, would pay Phil a dollar to work in his fields on Sunday. One Sunday night Phil came home after dark. I accosted him with:

"Where have you been, Phil?"

"Oh, jest knocking about, massa."

"You have been working for Miller."

"Well, you see massa, the old fellow is in weeds, and he jest showed me a silver dollar and I jest couldn't stand it."

"Ain't you afraid the devil will get you for breaking the Sabbath?"

Phil scratched his head a minute and said:

"I guess the Lord'll 'scuse me, massa."

"No. He says, 'remember the Sabbath day and keep it holy.'"

Phil went off looking pretty sober, and it was not long before I heard his voice in fervent prayer, back of the barn, so I thought I would slip down near enough to hear.

"Oh, Lord!" I heard him say, "I have this day ripped and teared, cussed and swore, at them confounded oxen of Miller's and jest broke the Sabbath day. Oh, Lord, please forgive me; please forgive me, for you knows I'es nothing but a miserable heathen anyhow. If you'll jest forgive me this time I'll never do it again as long as I live, 'cep'n he gives me \$2.50 a day."

At this point I was obliged to beat a hasty retreat, but I am thinking that poor Uncle Phil isn't the only \$2.50 Christian in this world.

UNITED STATES MILLER.

PUBLISHED MONTHLY.

Office, 62 GRAND OPERA HOUSE, MILWAUKEE, WIS.
Subscription Price, \$1.00 per year in advance
Foreign Subscription, \$1.50 per year in advance

ANNOUNCEMENT.

Mr. P. SCHNEITLER, Berlin, N. Mueller St., 179 B, is duly authorized to receive subscriptions and advertisements for the UNITED STATES MILLER, from all parts of Continental Europe, and to receive payment for the same.

HENRY F. GILLIG & Co., 449 Strand, London, England, are authorized to receive subscriptions and advertisements for the UNITED STATES MILLER.

MILWAUKEE, MAY, 1880.

MILLERS' DIRECTORY FOR 1880.

All mill-furnishers, flour brokers or other parties desiring to reach the flour mill owners and millwrights of the United States and Canada, should have a copy of the above named work. It contains about 15,600 names with Post-office addresses, and in many cases (notably in Wisconsin and Minnesota) gives the number of runs of stone, sets of rollers, and kind of power used, or the capacity in barrels. A limited number of copies only have been printed. Upwards of fifty of the leading mill-furnishing houses and flour brokers in this country and several in Europe have already secured copies. Send in your orders at once. Price Ten Dollars, on receipt of which Directory will be forwarded post-paid by mail, registered. Address

UNITED STATES MILLER,
MILWAUKEE, WIS.

This office of the Secretary of the National Millers' Association, has been removed to No. 79 Wisconsin street, Milwaukee.

If you are not already a subscriber to the UNITED STATES MILLER, send one dollar at once and begin with our May number, which commences the fifth volume.

We call the attention of our readers using steam, to W. F. Brummer's advertisement of a compound for cleansing boilers from scale and other deposits. It is pronounced by parties who have used it for a long time to be the best thing known for the purpose.

Secrecy in Milling is Played Out.

We have long and earnestly protested against the policy of trying to keep secret any important discoveries in the method of the perfect and economical manufacture of flour. It is a poor and selfish policy. European millers used to be noted for trying to keep their methods secret, and refused to allow any one, save their own employees, to go inside their walls. This was especially the case in Budapest, the greatest milling centre of Europe, and it was to the astonishment of the whole trade that the Pest roller mill, in October, 1878, allowed the correspondent of the UNITED STATES MILLER to publish a complete description with exterior and interior views of their great mill, one of the most important in Europe. On account of this publication many of our millers visited Budapest and they found the way partially paved for them to secure information of value, and we are reliably informed that the old prejudice in favor of keeping the mill doors closed against visiting brethren of the craft is rapidly wearing away, and they are now desirous of showing their way of grinding and learning ours.

We are to have a great exhibition of milling machinery and products in this country, at Cincinnati, in June. The gentlemen in charge of it have advertised extensively in foreign milling journals, and have urged foreign millers to cross the ocean and see our show, and visit our mills, and learn what they could. It has been hinted through some of the milling papers that the foreign millers would not be allowed to visit our leading flour mills. We have disputed this, and three days previous to going to press with this, we sent out the following circular to fifty of the leading mills in the West.

OFFICE OF THE UNITED STATES MILLER,
MILWAUKEE, WIS., April 27, 1880.

DEAR SIR: As there has been considerable said in American and foreign milling journals during the past few months on the question whether millers in the United States would allow visitors from foreign countries who will come here for the purpose of visiting our millers exhibition at Cincinnati in June next the privilege of visiting their mills, we address you this circular, and ask you if you will allow delegations of foreign millers to visit your mills and show them through. We desire to know positively the feelings of our leading

millers in the Northwest on this subject. Please answer by return mail.

UNITED STATES MILLER,
Milwaukee, Wis.

Our Milwaukee millers without exception will grant visiting members all reasonable requests. Mr. S. H. Seamans, of the Empire Mills, says: "Will be pleased to show the gentlemen all we have, and render them any service in my power." We casually met Mr. J. B. A. Kern, proprietor of the Eagle Mills (the largest mill in Wisconsin), and he said his mill would not be running in June, but if the foreign gentlemen had any desire to see it he certainly had no objection.

Messrs. Barnes & Hodson, of Janesville, Wis., proprietors of a model eight-run mill, will receive visitors with pleasure. H. A. Hayden & Co., of Jackson, Mich., say millers duly accredited will be courteously received by us and granted freedom of our mills.

Messrs. Merrill & McCourtie, extensive mill-owners of Kalamazoo, Mich., and very successful millers, say, "We will admit them with pleasure, and give them any information we can that will be of service to them."

The La Grange Mills, of Red Wing, Minn., Kimberly's Mills at Neenah, Wis., and the Yager Mills at St. Louis, for special reasons will not receive visitors. We believe all the other St. Louis mills will "keep open house." Hon. Geo. Bain, President of the Atlantic Milling Co., writes the following characteristic letter:

In answer to your circular, permit us to say that we shall be pleased to show any of the foreign visitors who attend the Exposition, through our mill. We believe that our facilities in the selection of wheat, and of freights, both inland and ocean, give us an advantage over them; that, even granting they used the same machinery we did, they could not overcome. We want to convince our British, Irish, French and German millers that they had better wreck their mills and come to St. Louis and engage in the milling business.

Ex-Governor Stanard, of the Eagle and Park mills, St. Louis, writes warmly: "It will afford us great pleasure to show them through our mills, and we hope to see them here."

Mr. M. T. Boulton, of Appleton, Wis., the proprietor of the handsome new Riverside Mills, in a good-humored vein writes: "I have no objection to the foreign millers visiting our mill, and will show them through. Can't see that they would necessarily injure the building, damage the goods, or detract from the manly beauty of our head miller. Let them come."

The Norton Mills, of Chicago, express their willingness to receive visitors. The Minneapolis millers, so far as heard from (we have at this writing three responses), seem opposed to taking visitors through their mills. Judging from the annexed letter from a prominent milling firm in Minneapolis, there seems to be some feeling in the matter:

"Your favor of 27th to hand. In reply would say that unless it be some one with whom we have been doing business our mill will not be open for inspection. The Exposition was gotten up without consulting the millers of our State at all. Invitations have been extended to foreign millers to visit our mills, not by ourselves but by parties unknown to and unauthorized by us. I know not what the general feeling may be, but for my own firm would say that I am perfectly willing to let those who have fathered this thing from the beginning, so continue, and should there be any benefit derived from it let them have it."

We have heard from nearly one-half of the millers addressed on the subject, and if another day intervened would probably hear from many more, and objections have only been noted in a half dozen instances. Judging from these results we feel justified in our statement that we believed that most of our millers would be pleased to extend the courtesy of a ramble through their mills to foreign visitors.

Destruction of Milling Property at Dixon, Ill.

One of the most terrible fires that ever visited our city broke out this morning about half past 1 o'clock (April 8th), in Thompson & Co.'s flouring-mill, and before our firemen could get to work the flames had progressed so far that it was impossible to check the fire, and in an instant the accumulations of a life of toil were swept away; but that is nothing to the loss of life and the suffering of the poor, brave firemen, whose wounds are being dressed as we write. Ezra Becker, William Schum and Cyrus Lint went into the tool-house, east of Becker & Underwood's mill, to procure implements to work with, and while there the terrible explosion took place which threw the east wall of the building upon them and they were all carried into the mill-race. Mr. Lint, in some manner he knows not how, got out, but the other two were killed. The bodies of Becker and Schum were recovered about 9 o'clock this morning. Both were

mangled, and one of Mr. Becker's legs was broken. Mr. Schum was a young man, clerk in Hegert's drug store. His parents live in Dubuque.

There was a terrible explosion when the fire reached Becker & Underwood's mills. The roof was blown off and a large portion of the east wall thrown down. When the explosion took place there were a number of firemen at work on the front addition to the mill, which is one story, and several at other places near, and all were wounded, some severely.

Cyrus Lint—Two gashes in the head, and is injured in the spine.

Orvil Anderson—Severely burned; his eyes are swollen shut, and it is feared he may not recover his sight. He was blown from a second-story window. It is a wonder he escaped with his life.

William Rink, Jr., head severely bruised; both arms broken and it is feared injured internally.

Patrick Duffy, dealer in butter and produce, is severely burnt, and suffers very much from that and other injuries. He is severely hurt.

Joe Rueland, hands severely burnt and other slight bruises and cuts. He is able to be about.

Peter Ramsey (partner with F. J. Finkler) suffers very greatly from burns and injuries about the head and face.

Lee Stevens was badly burnt on the face and hands. Joe Hayden suffers from painful but not dangerous burns. Dwight Heaton fell and broke a leg while working at the fire. Augustus Lenhart, not seriously. John Cahill, not seriously.

The loss of property is nearly \$250,000; insurance, about \$68,000. The losses, as near as we can estimate in the haste, were Becker & Underwood's mill, \$95,000; insurance, \$35,000. Thompson & Co., \$45,000; insurance, \$20,000. S. C. Ellis, flour mill, \$25,000; no insurance. Clapp's mills, \$35,000; insurance, \$6,000. J. Dement, \$45,000; Thomas Baldwin, loss in stock, \$3,500; Brown & Edwards, \$3,000.

The Amboy Fire Company, with their steamer, arrived at about 3 o'clock, and rendered excellent service until day light. Our thanks are again due our neighbors for prompt help. Our fire pumps were completely shut off by the burning of the building in which they were located at about the time that assistance arrived from Amboy, still with buckets of water the fire was then under control.—Dixon Telegraph.

Situations Wanted, etc.

Millers, Engineers, Mechanics, etc., wanting situations, or mill-owners and manufacturers wanting employees, can have their cards inserted under this head for 50 cents per insertion, cash with order.

WANTED—By a respectable single man, age 33, a situation as miller, 15 years' experience in England and the United States. Is a good stoneman and accountant. Address B. N. A., McGrawville, Cortland Co., N. Y.

SITUATION WANTED—In either merchant or custom mill. I thoroughly understand milling in all branches of the business, and will guarantee satisfaction both in yield and quality when parties adopt my system of bolting. From 43 to 46 pounds of No. 1 flour can be made from 60 pounds of clean wheat. First-class references given. Am not particular as to time needed. Can come at any time. Correspondence solicited. Parties answering please give description of mill, state terms, etc. Address MILLER, apv Rauch's Gap, Clinton Co., Pa.

A MODERN MINNESOTA MILL.

Description with Illustrations of John M. Cole's New Mill at Rochester, Minn.

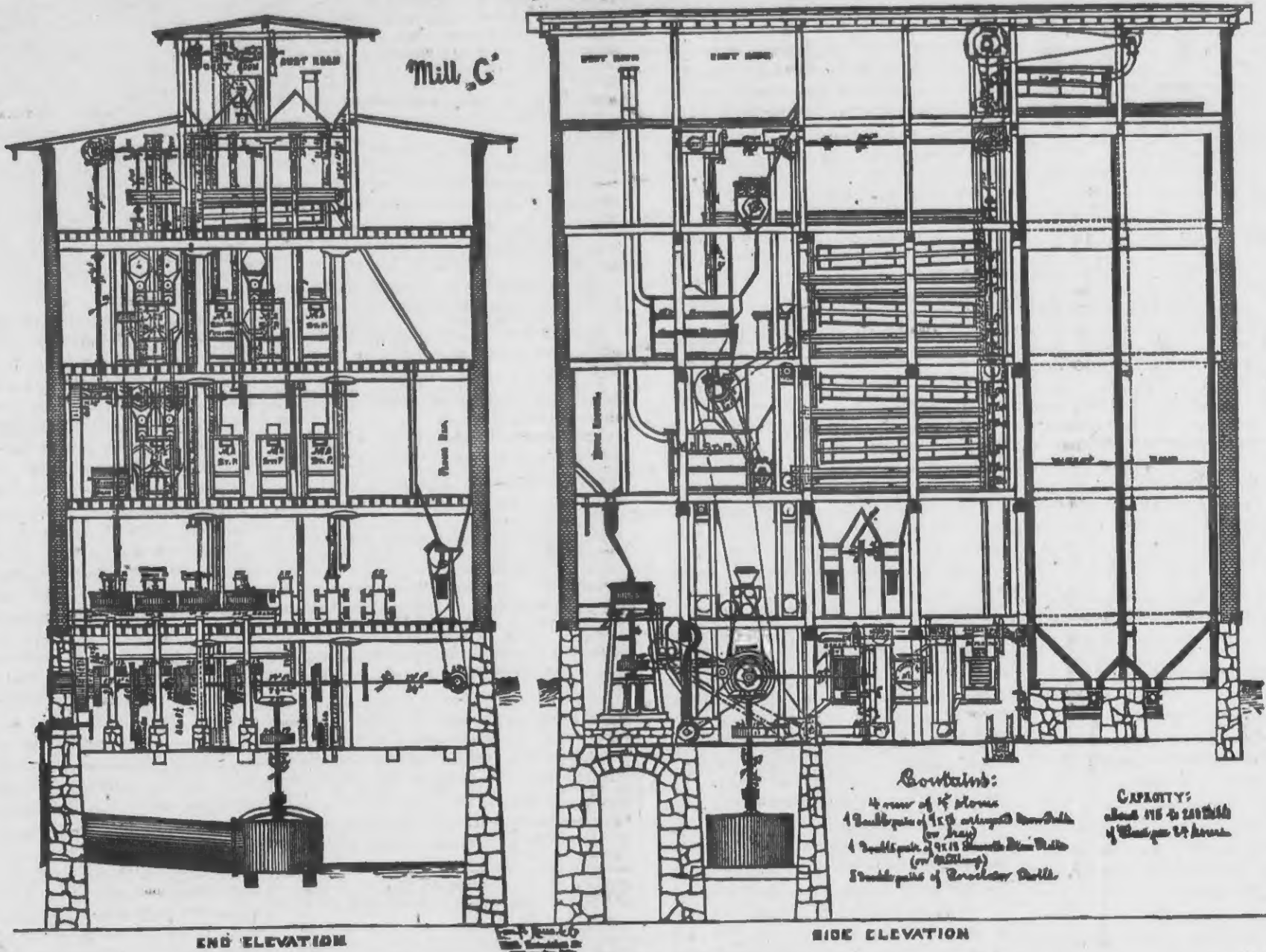
AN ARTICLE WHICH SHOULD BE PERUSED AND STUDIED WITH INTEREST BY MILLERS AND MILLWRIGHTS.

"I fancy that there are yet some amongst manufacturing business men that strongly resemble Diogenes, the ancient Greek, in many respects. He was willing and contented to live in a barrel, drink out of the hollow of his hand (bungholes had not been invented in those days), and had no greater favor to ask of Alexander the Great than to stand out of his light so that the sun might shine upon him. (History does not state whether Diogenes was just recovering from an agueish chill or not). These modern imitators of Diogenes of old prate about modern inventions and call them humbugs—yes, shameless attacks on their well-guarded purses. All descriptions of new improvements they consider ink and time squandered; in every stranger coming within their doors they imagine they see an agent for some mill-furnishing house, and they are ready to "go for him," or to hide their feelings by assuming the attitude of a well-informed man that is persuaded of the unquestioned superiority of the old and established way of doing things. This class of men complain that years and years ago they built their mills in first-class style, did good work and accumulated snug fortunes, and they were content, and would be still content if those turbulent, unwearied and unrelenting souls of millwrights had not had the impudence to keep on inventing and improving and changing the way of doing things, thus malignantly tending to undermine their feelings of contentment and security. But I notice that, at the present time, all millers are unusually watchful, and realize that it is all important to keep abreast of the times. When they see

that their neighbor is getting in some new machinery, and dusty old machinery is being pitched unceremoniously out of the windows, they reluctantly follow his example, and I am pleased to know that at present, either through force of circumstances or through natural inclination, the milling trade has more men of liberal ideas than it ever had before—men who are willing to spend their time and money to make improvements. Millers, it will not do to stand still in the onward march of improvement. We have got to save power and fuel; in making our flour, work must be saved wherever it is possible, and that confounded bran must be finished so light that a carload of it won't weigh much more than a score of pounds; the flour must be sharp—"diamond dust" fine, white as the virgin snow, and lots of it; the percentage must be—no, I will not tell it to you here—it must be only spoken of in a whisper. Secrets must not be told out loud. But on this occasion I will tell you about a new process mill, which is the pride of the owner and a pearl in the diadem of the designer and builder. J. M. Cole, Esq., is the name of the enterprising owner, and he lives and grinds at Rochester, Minn. He is one of the pioneers in the study and search after the most approved method of economical milling. The designer is W. D. Gray, Esq., milling engineer with Messrs. E. P. Allis & Co., of the Reliance Works, Milwaukee, Wis., who built the mill, which is equivalent to saying that the work is thorough and substantial in every respect. The mill building is substantially built; ample light and space were objects sought for by its designer. The foundation is strong, and as near everlasting as can be made by human skill, all of which you may well believe by studying the accompanying illustrations, which are true copies of Mr. Gray's working drawings. The building is 48 by 70 feet, and 75 feet high above ground. It has a basement, four stories, and attic. All the stories but attic are fourteen feet high between floors, thus affording ample room for convenient spouting. The roof and cupola are covered with galvanized iron (cupola is all iron), so as to render all fire-proof. The motor is a Leffel turbine wheel, working under a twelve-foot head, furnishing ninety-horsepower. The water passes through the mill transversely. The water wheel upright drives directly onto the upright for the grain-cleaning machinery by edge-up, horizontal belt. This can be dropped by taking off the iron-tightener, thus setting the cleaning machinery in motion instantaneously. The cleaning machinery consists of a Barnard & Leas Separator, a Kurth cockle separator and a Richmond brush machine. Main line shaft runs across the mill, and drives directly four pair of four-foot violet French burr millstones, five of Gray's patent noiseless roller mills, with Wegmann's porcelain rolls, two of Gray's patent 9x18 iron rolls, one smooth and one finely corrugated—a stone suction fan and all the machinery above. Motion is transmitted to the upper main shaft by a sixteen-inch double leather belt which is set idle by moving an elegant iron tightener on the grinding floor. The stone curbs are made of black walnut; the silent feeders are of glass, so that the miller can observe at a glance the perfect working of the stones. All other furniture over stones on grinding floor is nickel-plated. The main line-shaft indirectly drives two packers by one belt, each packer shaft being connected to the shaft of driving pulley by a universal coupling. The upper main shaft drives directly one Richmond bran duster and eight standard purifiers No. 3, and indirectly all upper elevator shafts and bolt uprights. There are ten eighteen-foot reels, one twenty-foot grading reel, and one twelve-foot wire reel. In one corner of the building are four bins with laminated walls, having a capacity of 10,000 bushels. Wheat is received in a hopper scale of sixty bushel capacity near the office and conveyed by a Caldwell's iron conveyor to the receiving elevator boot. The elevator reaches up to the roof, is driven by an eight-inch belt, and has an elevating capacity of twelve bushels per minute. The shaft through the elevator head an E. P. Allis Iron Suction Fan, No. 1, and the wire reel above mentioned. The elevated wheat enters the reel and the suction fan draws out the dust, straws, etc., before the wheat is dropped into the bins. This receiving machinery is driven by an eight-inch belt, and by removing an iron tightener from this belt the receiving elevator, fan and reel is stopped. Underneath the storage bins are some Caldwell iron nine-inch conveyors, which take the wheat to the cleaning machinery, which latter exhaust the dust and chaff into a dust room in the basement, after which it is elevated to the garners over the stones.

4 Run Mill

Hungarian type 80 to 90.



MR. J. M. COLE'S FLOURING MILL AT ROCHESTER, MINN.

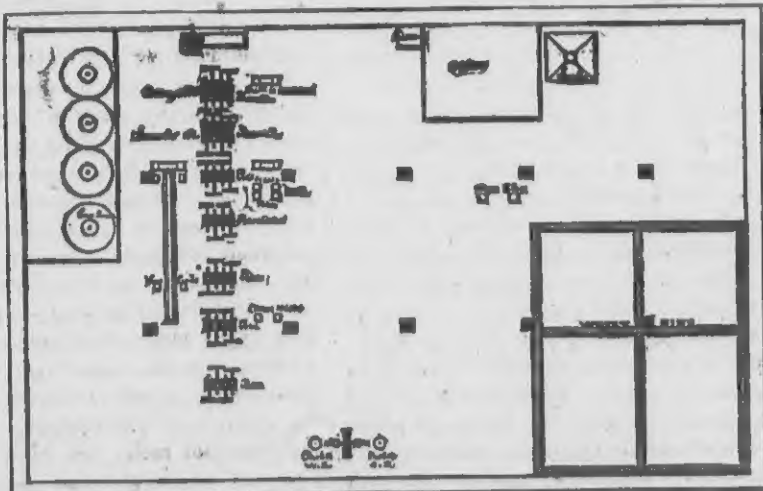
The system of operation in this mill is not the regular Hungarian, as the wheat is not granulated on corrugated rolls, but it is a high grinding system, with subsequent bran reduction on corrugated rolls. The wheat is ground very high on three runs at the rate of from eight to ten bushels per hour. The meal is elevated to one tier of reels in an eight-reel chest. The tailings of scalping reel, consisting of very rich bran, are dropped into one of Gray's aspirators, manufactured by E. P. Allis & Co. Here the fine bran is blown out, thereby increasing the capacity of the 9x18 corrugated roll, into which the heavy bran is dropped, and improving the meal of this roll. From there the bran goes on to the upper reel

in a two-reel chest, where it is scalped. The tailings are passed through the bran-duster. The bran is then perfectly clean, and is then elevated to the bran bin. All middlings are elevated to the grading reel. The coarse middlings are purified and passed through iron rolls to flatten the germs which are tailed off and spouted to the fourth run, to be ground with other low-grade stuff to low-grade flour. The finer, fine and dusty middlings are taken to the purifiers of third floor. The returns of these purifiers are re-purified on machines below second floor, and then spouted to the porcelain rolls. The meal of these is elevated to the fancy reels, making the other tier of reels in the eight-reel chest. Tailings and second

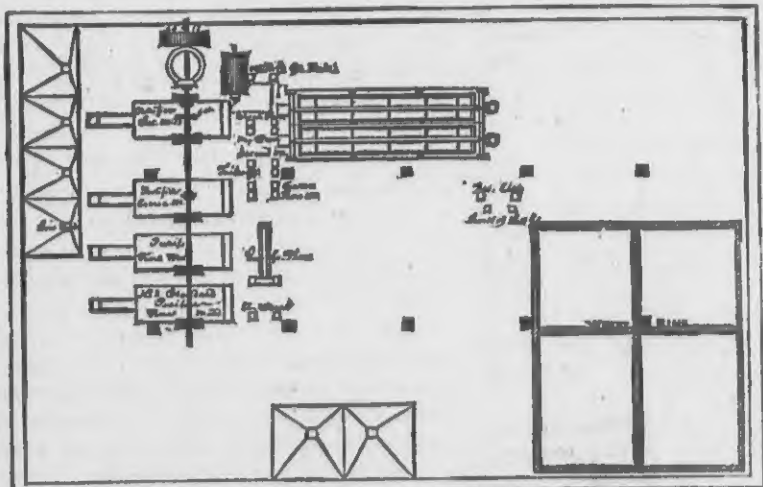
middlings are re-purified and ground on porcelain rolls. The tailings of seven purifiers are re-purified on the eighth machine, and the tailings of this machine, together with the poor tailings of the fancy reels are dropped to the low-grade stone. Wheat flour (so-called) is made on one side of the eight-reel chest; fancy flour (two grades) on the other side of the eight-reel chest, and the two-reel chest is used for bolting bran and low-grade meal, producing low-grade flour. There are provisions made consisting in flour-mixing conveyors, so that a straight-grade flour can be made at any time. The purifiers and aspirator blow into the dust room in the attic, having three collecting conveyors. These deposits are

dropped on the low-grade stone. The tailings of the lower reel of the two-reel chest are shorts.

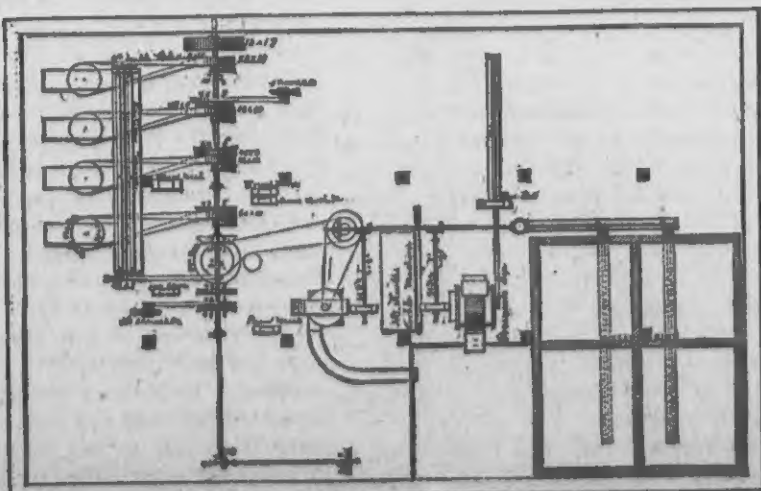
This mill is doing excellent work. It started up and run without causing hot bearings. Accompanying this our readers will see the diagrams as carefully worked out by the designing millwright, which shows the reels, machines correctly, and has the numbers of the cloths duly inscribed, and lines drawn, provided with directing arrows to show the course which this or that product has to take. By thoroughly studying these diagrams any miller can break himself in to successfully run a mill of any complicated system, on the Hungarian or any modification thereof.



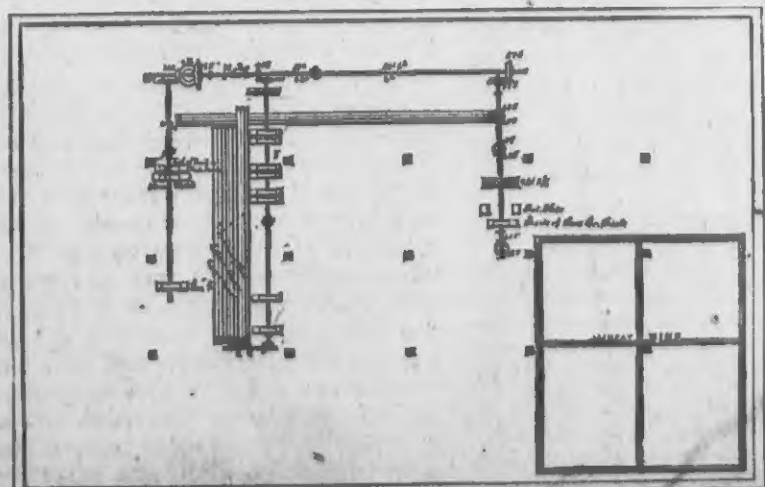
GRINDING FLOOR.



BOLTING FLOOR.



BASEMENT



ATTIC

FLOOR PLANS IN MR. J. M. COLE'S MILL AT ROCHESTER, MINN.

UNITED STATES MILLER.

E. HARRISON CAWKER, EDITOR.

PUBLISHED MONTHLY.

OFFICE, 62 GRAND OPERA HOUSE, MILWAUKEE, WIS.

SUBSCRIPTION PRICE.—PER YEAR, IN ADVANCE.

To American subscribers, postage prepaid... \$1 00
 To Canadian subscribers, postage prepaid... 1 00
 To British subscribers, postage prepaid... 6s sterling.
 To French subscribers, postage prepaid... 75 cent.
 To Austrian subscribers, postage prepaid... 3 Florins.
 To German subscribers, postage prepaid... 5 Marks.

All Drafts and Post-Office Money Orders must be made payable to E. Harrison Cawker.
 Bills for advertising will be sent monthly unless otherwise agreed upon.

[Entered at the Post Office at Milwaukee, Wis., as second-class matter.]

MILWAUKEE, MAY, 1880.

THE UNITED STATES MILLER has now commenced its eighth volume, and has become universally acknowledged to be one of the most valuable milling journals in America, both for the purpose of transmitting knowledge on milling and mechanical subjects and as an advertising medium for introducing and selling all kinds of modern milling machinery. It is our aim to meet the wants of our patrons, whether manufacturers or consumers. Our editorial course will be entirely independent, and we shall do our best to give our readers the benefit of the latest important news on subjects pertaining to the objects of this paper. Our circulation and advertising patronage cover all sections of the country. We do not deal in machinery ourselves, and consequently have no "axes to grind." We cordially invite all those who have already patronized us to continue their patronage, and those who have not to try our columns. We append herewith our

ADVERTISING RATES FOR 1880.

| | 1 mo. | 3 mos. | 6 mos. | 1 year. |
|-------------------------------|---------|---------|---------|---------|
| One inch card..... | \$ 2 00 | \$ 4 00 | \$ 5 50 | \$10 00 |
| Two "..... | 4 00 | 8 00 | 11 00 | 20 00 |
| Four "..... | 8 00 | 12 00 | 16 50 | 30 00 |
| One-half col. (8 inches)..... | 10 00 | 20 00 | 30 00 | 60 00 |
| One-fourth page..... | 20 00 | 40 00 | 60 00 | 120 00 |
| One-half page..... | 40 00 | 80 00 | 120 00 | 200 00 |
| One page..... | 100 00 | 200 00 | 300 00 | 500 00 |

Size of page, 12x18. Length of column, 16 inches.
 Width of column, 2½ inches; 4 columns to each page.

Business editorial matter per line, 30 cents. If over 50 lines, 25 cents.

Illustrations charged for in proportion to space occupied.

Advertising for Millers wishing situations, or millers wanting to engage employees, 50 cents.

MILL FOR SALE advertisements, \$2 each insertion.

Subscription price to the UNITED STATES MILLER, \$1 per year.

McLean's Millers' Text Book, which every miller should have. Price by mail, 60 cents, post paid.

Ropp's Easy Calculator, which every business man should have in his pocket or on his desk. Price by mail, post paid, FIFTY CENTS.

Our Job Printing Department is one of the finest in the State, and particular attention is paid to all kinds of commercial work, which we can do on the most reasonable terms. Parties desiring to publish catalogues, circulars, etc., should send for estimates.

Address all communications to the
 UNITED STATES MILLER,
 Milwaukee, Wis., U. S. A.

Subscribe for the U. S. MILLER; \$1 per year.

We will send a copy of the MILLERS' TEXT BOOK, by J. McLEAN, of Glasgow, Scotland, and the UNITED STATES MILLER, for one year, to any address in the United States or Canada, for \$1.25. Price of Text Book alone, 60 cents. Send cash or stamps.

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

THE St. Louis Operative Millers have legally organized an Association and have a regular charter. We have been favored with a copy of their charter and constitution and by-laws, which shows commendable enterprise and method. The organization is styled "Operative Millers' Association, No. 1, of St. Louis, Mo."

The Millers' International Exhibition.

We are pleased to note that the interest in the coming Millers' Exhibition at Cincinnati, commencing May 31, has been steadily growing and that already so many parties have made their formal entries for exhibition and competition. It is generally believed that this special exhibition will be the largest and most interesting of the kind ever held. It is the first time in the history of the trade in this country that the Mill-furnishers have had a fair chance to bring their products before the milling fraternity, and it will unquestionably be duly appreciated by both the mill-furnishers and the millers. If there is any man on the face of the earth that the miller should respect and treat with consideration it is the inventor or manufacturer of a good and useful machine for use in his mill. This exhibition will bring the millers, inventors, manufacturers and machinery face to face, and give all the opportunities desired. The exhibition will be in many cases positive in its results. It will make or mar the fortunes of many an exhibitor. The attendance of millers from every

part of the country will be large and the number of foreign exhibitors considerable.

The National Association will be called to order at 12 o'clock, June 1, and the regular proceedings of that body will probably be completed in about three or four days, perhaps less. Many valuable papers on milling will be read and the occasion will be made pleasant and profitable to all concerned.

From Germany and Austria.

The following items are translated from our German and Austrian milling exchanges especially for the United States Miller, and other papers copying any of them are kindly requested to give due credit.

According to an official paper by the "Association of German Millers," a miller in Germany can, on an average, expect a profit of not more than three marks (75 cents) net per ton, and this only by keeping the mill in uninterrupted operation.

AMERICAN COMPETITION IN THE GRAIN TRADE OF HUNGARY.—The general rise in the value of wheat was greater and more sudden in Hungary than elsewhere, so that American competition which had previously been noticed only in the grain trade at once became remarkable in the flour trade also. America is beginning to occupy a commanding position in this line, which may, under circumstances, seriously interfere with our trade, and which we would do well to calculate upon.

One of the peculiarities of the American trade is, that it does not limit itself to direct sales, but is continually flooding the market with consignments. This manner of carrying on business had the result, that for instance, the enormous advance on the price of wheat from October to December, had no remarkable effect whatever either on the price of our own flour or on the consignments of American flour than in Europe, since at the beginning of the advance the English market had its full supply for the ensuing months already. As in the grain trade we cannot be certain in our conjectures regarding the future of the flour trade, but can only consider the conjectures of the past, and their causes, and from them draw our conclusions.

Considered from this standpoint, it is satisfactory for us that we are able to state that American competition will only interfere with our trade in the poorer qualities of flour, from No. 3 downwards, since the millers there have no wheat that will come up to ours in quality, and so they cannot possibly become our competitors in the better qualities, from No. 0-3.

As to the medium grades, besides Russia we have in America a competitor in the markets of the world that should not be undervalued, and which, should there be high freight and poor harvests, would considerably interfere with our sales.

Taken altogether, we are sure of the markets of the world for the best grades, from No. 0-3, in which qualities we have no competitors, as also for the poorer qualities, No. 4 and 5, which will always be in demand in Great Britain, at least in smaller quantities, for the improvement of their own stock, even when prices are less favorable.—From an article in the "Oesterreichisch-Ungarische Mehl-ler" on "The Hungarian Flour Trade during the year 1879."

SMOOTH AND GROOVED ROLLERS.—One of the leading Hungarian millers asked the opinion of the best known experts about the merits of smooth and grooved rollers, and which of the two they deem the best and most profitable. In consequence of the information received, he concluded to have his mill supplied with grooved rollers, and to do away entirely with the smooth ones. Unfortunately, the experts seem to have neglected to consider the fact that grooved rollers will, to be sure, make more fine flour and less of the groats or coarse flour than the smooth ones, but this coarse flour will be darker than when produced by smooth rollers. The perception of this fact induced the miller to publish and inform all the world that grooved rollers are worth less. What little effect this announcement had is best proved by the fact that no heed has been taken of it. Any miller will at once understand that the cause of the above-named result is owing to the fact that all the dirt still adhering to the grain, notwithstanding it has been carefully cleaned, must, when ground with grooved rollers, concentrate in the relatively smaller quantity of the coarse flour, and, consequently, make it appear darker; but that the greater amount of fine flour obtained fully outweighs the difference in the quality of the coarser flour. Moreover, the darkness of the coarser flour is not owing to the rollers at all, but, on the contrary, to the yet imperfect cleaning machines which do not remove entirely the dirt adhering to the grain.

When grinding (reduction) was first done with

rollers the smooth ones were preferred to the grooved rollers, but it was soon discovered that the purer coarse flour, dust flour and white grits which were produced by the use of the former were realized only by decreasing the quantity of finer flour obtained, while the greater amount of grits obtained by the use of grooved rollers always produces a good flour; besides this, there is a certain kind of soft wheat which can only be ground successfully on grooved rollers.

For the grinding of hard wheat smooth rollers might do, yet they are not preferable for the above-named reasons, and also because it requires to be ground oftener with smooth than with grooved ones. Hence the greater advantage of the use of grooved rollers is evident, and millers universally acknowledge the fact by furnishing their establishments with them.—*Budapecster Muller Zeitung.*

COMMISSIONED BY THE PRUSSIAN GOVERNMENT AS WELL AS BY THE ASSOCIATION OF GERMAN MILLERS.—Mr. Joseph van den Wyn-gaert will visit the United States toward the middle of next month, and may not only attend the exhibition in Cincinnati, but will make a study of the American milling industry, the cultivation of grain in its present and probable future extent, the grain and flour trade, transportation, the credit system, etc., and give an account of it later. This report will be made at this year's general meeting of the Association of German Millers, the date of which has been fixed with regard to it on the 5th to the 8th of September.

PORCELAIN AND CHILLED IRON ROLLERS.—A German miller requested to give his opinion as to the relative merits of porcelain and chilled iron rollers does so in the following words: First of all, I must mention that the grinding of fine flour can only be done up to a certain extent by rollers, but the same results may be obtained with chilled iron as with porcelain rollers. It is only on perfectly smooth rollers, that is, when the material is of very fine grain, that grinding up to a certain degree can be done at all with differential velocity, for the grinding with rollers does only apply up to the fine flour, No. 8 (according to European classification), while, when finer, it can as yet be ground only on stones. Of course the stones must be well arranged, and they will then move easily and yield from 65 to 70 per cent. of fine flour. Should it be desired, however, that this fine dust flour be ground on porcelain rollers, it would be found out to be an impossibility for this reason alone, that the mass has pores as large as is the size of such a particle of dust, and it would consequently glide through unground, this being impossible when the grinding is done with stones. When new a porcelain roller roller works much better than later, proving that the increasing roughness has its disadvantages. Only a faulty arrangement of the stones is the cause that the flour is sometimes spoiled by heating it to a degree that it is almost roasted, which is detrimental to the gluten and starch cells. According to my experience, porcelain rollers are not durable. Mine have been in use not quite six months, but are already much worn and partly broken, while I do not even grind dust flour, but only grits. There is no doubt that grits can also be ground with porcelain rollers. The only question is the difference in the first cost, the space required, and whether better results are obtained or not. I have made many experiments so as to find out the difference between porcelain and chilled iron rollers, and will here state the results of numerous such experiments. By the most conscientious tests I have found that it took just double the time with Wegmann's double porcelain rollers, when using them to their full capacity that it did with Ganz & Co.'s roller system to grind the same quantity of grain. The corresponding results are the following:

| G. & Co. System. | Porcelain R. System. | through silk. | No. |
|------------------|----------------------|---------------|-----|
| 8% | 3 per cent | " | 16 |
| 9 | 3 | " | 15 |
| 14 | 7% | " | 14 |
| 17 | 13% | " | 13 |
| 27 | 20 | " | 10 |
| 14 | 13% | " | 9 |
| 6 | 5% | " | 8 |
| 3% | 3% | " | 7 |
| 3 | 4 | " | 6 |
| 4% | 5% | " | 5 |
| 8% | 15 | " | 5 |

I must yet remark that the quality of the product when compared was exactly the same. I have before said that in comparing the two systems three points are to be considered: The first cost, space required and work done.

First Cost.—If I require four porcelain rollers to grind a certain quantity of grain in twenty-four hours, then I will require 14x4=56 porcelain rollers to grind fourteen times that quantity, while I have found out by experience that eighteen chilled iron rollers will be all required to grind the same quantity. As to the power required I find that 4 horse power

is sufficient for one iron roller, and 2 horse-power for a porcelain roller; consequently the system of Ganz & Co. would require 72, while Wegmann's porcelain roller system would require 112 horse power.

Space Required.—The question will answer itself whether 18 or 56 rollers require more room.

Work Done.—The above-stated results of my experiments furnish the answer. I have only to add that I may well be proud of the quality of the product of my mill, for it is as good as that of the best mills, and surely stronger and better than that of many renowned mills; this I only remark to prove that chilled iron rollers will no more than porcelain rollers spoil or improve the product.—*From Szegedin, correspondent of the Austro-Hungarian Miller.*

EXPORTS AND IMPORTS OF GRAIN IN THE GERMAN EMPIRE.—According to the imperial statistical reviews, the following quantities of the two chief kinds of grain were imported and exported from Jan. 1 to the end of November, 1879 (in kentles of 110 pounds).

Wheat.—From Jan. 1 to Nov. 30, 1879: Imported 17,595,627 kentles; exported 11,040,639 kentles. From Jan. 1 to Nov. 30, 1878: Imported 19,601,684 kentles; exported 14,811,168 kentles.

Rye.—From Jan. 1 to Nov. 30, 1879: Imported 27,204,438 kentles; exported 2,754,081 kentles. From Jan. 1 to Nov. 30, 1878: Imported 17,127,886 kentles; exported 3,654,751 kentles.

The quantity of the home crop in 1879 was not yet known in November when this report was published, since inquiries about it are made during the course of the winter; in 1878, it amounted to about 52,000,000 kentles of wheat and about 138,000,000 kentles of rye.

Personal.

Mr. J. B. Wheatley representing the well-known mill-furnishing firm, Messrs Huntley, Holcomb and Heine, of Silver Creek, N. Y., has about concluded to make his western headquarters in Milwaukee. He reports business very good considering the unfavorable times that millers have experienced of late.

Mr. J. B. Nehs, proprietor of the mills at Menomonee Falls, Wis., dropped in during the month. He has a 3-run custom mill, and says he has all he can do. Mr. Nehs is a venerable looking miller, and is an honor to the craft.

Wm. Lehmann has returned to his home in Milwaukee to avail himself of a little needed rest. He feels well satisfied with the reception his inventions have been favored with by Minnesota Millers.

We are under obligation to Mr. A. Millot, of Zurich Switzerland, for a copy of his new catalogue of milling machinery and supplies. It is a work of 240 pages with scores of fine illustrations. Any of our readers desiring to purchase or to gain information concerning European milling machinery will do well to address them. Correspondence may be either in the English, French or German languages.

Mr. Phillip Triggs, of Bristol, England, is now on a short visit to the United States and favored this office with a call April 14. He is taking steps to secure the rapid introduction of the Carr Disintegrating Mill in this country. It is in extensive use in Great Britain and in continental Europe. It attracted a great deal of attention at the Paris Exhibition in 1878. The mill, in various manners of construction, is used for pulverizing many other substances besides grain, such as bones, ores and rocks.

Henry Hamper Esq., the western representative of Messrs. Howes Babcock & Co., has favored us with calls of late. Mr. Hamper thinks of making Milwaukee his headquarters for the Northwest. He is a guest at the Newhall House.

Mr. Wilhelm Brown, of Carlsbad, Bohemia, writes us that he will arrive in this country about May 15th in order to visit the Cincinnati Exposition. Mr. Brown will exhibit his latest improved roller mills, a full description of which will appear in due time in the UNITED STATES MILLER.

The Cockle Separator Manufacturing Company, of Milwaukee, desire to call the attention of all millers to the fact that they will make a grand display of their cockle separators at the Cincinnati Exposition.

THE UNITED STATES MILLER has the largest circulation of any milling journal published in America, and was the first milling journal started in America entirely independent of connection of interest with some machine or mill-furnishing establishment.

The Chemistry of Bread Making.

CANTOR LECTURES, BY PROF. GRAHAM, D. SC.,
LONDON, ENGLAND.

[Lecture delivered Dec. 8, 1879.]

I have also here a series of results obtained by Mr. Brown, Demonstrator in the Laboratory of Chemical Technology of University College, for the purposes of these lectures, on the influence of moisture in the process which bakers submit the flour to when they add water at a certain temperature—100 degrees Fahrenheit, in degrading some flours compared with other flours.

INFUSION PRODUCTS OF FLOUR. (HENRY BROWN.)

| | Vienna Whites. | | | Best Whites. | | | Best Households. | | | Brown Meal. | | |
|------------|----------------|----------|----------------------|--------------|----------|----------------------|------------------|----------|----------------------|-------------|----------|----------------------|
| | Maltose. | Dextrin. | Soluble albuminoids. | Maltose. | Dextrin. | Soluble albuminoids. | Maltose. | Dextrin. | Soluble albuminoids. | Maltose. | Dextrin. | Soluble albuminoids. |
| Cold. | trace. | trace. | 0.76 | trace. | trace. | 0.76 | trace. | trace. | 0.76 | trace. | trace. | 0.76 |
| 2 Hours. | 2.41 | 2.17 | 5.16 | 2.41 | 2.17 | 5.16 | 2.41 | 2.17 | 5.16 | 2.41 | 2.17 | 5.16 |
| 4 Hours. | 3.65 | 3.79 | 7.20 | 3.65 | 3.79 | 7.20 | 3.65 | 3.79 | 7.20 | 3.65 | 3.79 | 7.20 |
| 8 Hours. | 4.09 | 4.35 | 9.73 | 4.09 | 4.35 | 9.73 | 4.09 | 4.35 | 9.73 | 4.09 | 4.35 | 9.73 |
| 12 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 16 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 20 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 24 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 28 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 32 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 36 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 40 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 44 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 48 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 52 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 56 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 60 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 64 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 68 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 72 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 76 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 80 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 84 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 88 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 92 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 96 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 100 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 104 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 108 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 112 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 116 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 120 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 124 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 128 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 132 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 136 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 140 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 144 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 148 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 152 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 156 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 160 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 164 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 168 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 172 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 176 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 180 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 184 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 188 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 192 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 196 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 200 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 204 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 208 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 212 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 216 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 220 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 224 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 228 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 232 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 236 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 240 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 244 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 248 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 252 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 256 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 260 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 264 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 268 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 272 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 276 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 280 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 284 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 288 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 292 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 296 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 300 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 304 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 308 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 312 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 316 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 320 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 324 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 328 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 332 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 336 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 340 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 344 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 348 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 352 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 356 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 360 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 364 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 368 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 372 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 |
| 376 Hours. | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1.23 | 4.35 | 4.35 | 1. |

The admixture of finely ground bran is detrimental to the fermentation process of bread making, and this admixture of an active albuminoid ferment, the cereal of bran, reduces high class wheats, from a fermentation point of view, to inferior wheats. Those who still attach such high importance to bran must, therefore, use the Dauglish carbonic acid method, or muriatic acid and bicarbonate soda, in order to avoid the injurious action of the soluble albuminoids. Later in the course, I shall propose a plan by which inferior flours may be used in the common bread making process without undergoing degradation, and I will point out how "whole meal" may also be so utilized without injury to the character of the bread. Though I am not a believer in the great merits of the vastly overrated bran, the suggestions I shall have to make will enable those who think so highly of it as a food material to obtain it in their loaf made by the fermentation process, without being driven to use the loaf of the artificial carbonic acid processes.

I now pass to another matter of considerable interest to millers, that is, the admixture of wheats. Small millers in certain parts of the country, especially in older times were not content—but they were compelled—to take the produce from the immediate neighborhood, but those living in the present age, have to compete with people who are making flour in Hungary, the United States and elsewhere, to invade our markets with, and have to consider the important problem of so utilizing our wheats, such as it may please God to give us from year to year, that although in the long run they may be inferior from some points of view to foreign wheats, they are fortunately usually so rich in some other qualities, that we can, by judicious admixture, obtain the flour requisite for a high class of bread, and even though we be visited with an unfavorable harvest, yet by judicious management—as for instance, by kiln-drying, and by judicious admixture of foreign wheats—we can, to a considerable extent, remedy the evils from which we are suffering. Not that we shall be able to make them equal to foreign flours for fancy purposes but we shall be able to make them good, useful flours, for ordinary household bread. The object, then, of the miller in this admixture of wheats—and in some cases, I understand that even as many as ten or twelve varieties may go into our flour—is to balance the soluble and insoluble albuminoids, so that he shall not have too great a quantity of soluble albuminoids, which our wheats are usually so rich in. Then, while he is looking for a foreign wheat that will fulfill the conditions of increasing his ratio of insoluble albuminoids to soluble, he must at the same time see that he does not reduce his starch too much. In this way—I was going to say he looked at Peligot's table, but of course he does not do that—he consults his own experience; but if we look at the table on the wall, we shall add that he will be influenced by these considerations. If he has an English wheat tolerably rich in starch, but yet, unfortunately, containing too much soluble albuminoids, he would look out for some such wheats as the Taganrog, some of the Hungarians, or some of the Egyptians. One of these Egyptians you see has nineteen per cent. of insoluble and one per cent. of soluble albuminoids; and thus, by mixing these with some of the very beautiful wheats grown in the center and south of Spain, and in some parts of the United States, he will find that he gets wheats that are very rich in starch, but not rich in gluten, and at the same time not very rich in soluble albuminoids. He is able, by a judicious mixture of the various wheats, so to reduce the ratio of soluble albuminoids as to produce the desired result, and yet obtain a high ratio of starch.

The miller has various ways of testing wheats. One method is to judge from the appearance, the weight, and the general character of the corn, the ability to do which well, long experience will give him. Perhaps he may grind some, and make bread of it. He also adopts the method of working it with water, so as to obtain the elastic gluten by constantly washing away the starch. Many years ago, a French baker of considerable ability (M. Boland), took this gluten, and after thoroughly washing it, but it inside a copper tube, graduated to scale, and then placed it in the oven. The importance of the gluten is that, being an elastic material, it entangles the carbonic acid, and rises as the gas expands, so as to form a well piled loaf. He not only weighed the crude gluten after it had been heated in the oven, but he also measured the amount of expansion of the gluten in the tube. There have been, in addition to this,

many other methods employed by which in addition to the experience of the eye, the hand, and so on, the miller has been able to judge of the quality of the wheat; and it is wonderful the amount of ability with which men can deal with these matters, even without the aid of apparatus or chemicals. So far as I know, most methods which have been recommended refer to the quantity of resisting gluten left after kneading with water. I would suggest the following as a useful method of examining flour, though I am not in a position at the present moment to recommend it strongly, because I have not had sufficient experience of it. We do not want merely to consider the amount of gluten—that is certainly a most important factor, because the greater the quantity of that the stronger the flour is—but we also wish—it may be as a subsidiary factor—to know the amount of soluble matters formed in the mashing or infusion process, the mixing with water, and keeping at a certain temperature for a certain time. We want to know, not merely the amount of gluten we can obtain but also the amount of soluble albuminoids, molasses and dextrin, that are formed. Now, I have here a series of test tubes properly labelled, and they refer to various qualities of flour—Vienna whites, best whites, best households, second households, and so on, and the process is as follows: One ounce of flour is weighed out and mixed with four ounces of cold water. This is allowed to digest for one hour. Then it is filtered through a piece of filter paper into one of these test tubes, which cost about 8d or 9d a dozen. They can be marked in two places, at the half ounce and at the one ounce. The first portion of the filtrate would be thick, and that you can throw away, but the second portion will be clear. If you were examining six kinds of flour, you would have six test tubes, into which you would filter the respective infusions.

According to Peligot's tables, and also according to the work done for these lectures by Mr. Brown, you will see that we get a rough idea—perhaps I ought not to say a rough, but a fairly good idea of the amount of degradation or hydration that goes on in a certain time from the different flours we take. I prefer, for the purpose of the test, to allow it to stand in the cold, because we want to know how much of the soluble albuminoids there are already formed which cold water will dissolve out. Perhaps some of you may prefer to let stand two or four hours, instead of one, but whatever method you adopt, it will be a method of comparing one sample of flour with another under similar conditions. This being done, you add a little methylated alcohol. This is about 80 per cent. strong of spirit, and costs about 5/ a gallon, being sold without the excise duty. If you add alcohol up to the second mark, and allow it to stand for some little time, you will find, according to the inferiority of the flour, so is the amount of the precipitate, and according to the superiority of the flour, so does the amount of the precipitate diminish. The more inferior the flour the greater the amount of matter precipitated, and *vice versa*. At present it is merely an opaque precipitate, but it will presently settle down to an apparently coherent flocculent precipitate, and then you can judge from the six tubes of the nature and the amount of soluble matter which has been obtained, by simply digesting the respective flours with cold water, either for one or two hours.

It is already past the hour, and I will, therefore, defer the subject of bread making to our next meeting.

[Lecture delivered Dec. 15, 1879.]

I have, at last, arrived at that stage of the course which, I fear, many of you must have thought I might have come to before; but, when one considers the very important and somewhat obscure phenomena underlying the baker's art, I think that the careful study of the properties of the different substances entering into the composition of bread, and of the very interesting phenomena connected with the hydration-products formed in the panification process, will be deemed of sufficient importance to justify the time I have given to this preliminary branch of the subject.

I, therefore, proceed this evening to the manufacture of bread, giving you a short outline of the process; but I do not propose to discuss at much length this part of the subject, because we shall have ample matter to consider it, irrespective of the technical details of breadmaking. I must preface my brief description of the process by the statement that bakers, in different parts of England, employ different methods in their art, and probably many here present, who are practical men, and who have done me the honor of at-

tending this course, will find in some points—perhaps, not many—that I do not describe the particular method they follow; but for the purposes of a general audience, I think it will be advisable to take bread-making as known in London, or in the West-end of London, as an illustration of the art generally.

The first part of the process consists in the preparation of what is technically called the "ferment." I ought to say, first of all, that a sack of flour weighs 380 pounds, and that a sack will turn out about 90 to 94 loaves of 4 pounds each, according to the quality of the flour; so that I shall deal with a sack of flour as the unit of the operation which I shall proceed to describe. Bakers themselves, inasmuch as it is much more convenient to measure water than to weigh flour, are in the habit of speaking not so much of the flour employed as of the water. The first part of the process is the preparation of the ferment. This consists in taking potatoes, about 6 pounds to 8 pounds to the sack—some use as much as 12 pounds—and the potatoes should be, of course, well selected, mealy, not waxy or unripe, or ill-matured. These are well washed, then boiled, in order to burst the cell walls of the potato starch. After they have been boiled thoroughly, they are mixed with additional water, and then put into a fermenting tub, and when the temperature of the water and of the mashed potato has cooled to 85 degrees Fahrenheit, the yeast is added. One quart of brewers' yeast is employed to the sack of flour, and in addition to this, a pound or two of flour is added to supply albuminous food to the yeast, and this constitutes the "ferment." Fermentation commences, the soluble starch—the properties of which I have previously described—is affected partly by the direct action of the yeast, and partly by the action set up by the yeast ferment on the soluble albuminoids in the flour which has been added, and the result is the hydration of the starch and the conversion of the starch into the sugars and dextrin, which I have described so fully. This process goes on for some five hours; it rises during that time, and at about the end of five hours, varying a little with the temperature, the head falls in. The head having fallen in, it is allowed to remain in a quiescent condition for two or three hours, and then the baker proceeds to the next stage, which is the preparation of the "sponge." They call it "stirring the sponge." In the preparation of the sponge about one-fourth of the total flour—or one-third, according to the practice of those bakers who prefer a stiffer sponge—is taken. This is placed in the trough, and the "ferment" is added, along with more water at 85 deg. Fahr., the whole of the ferment being forced through a sieve, to remove the skins of the potatoes used, and thus the skins do not come into contact with the sponge. The potato, skins and flour on the sieve are well washed by the water here added. The total amount of water used in the ferment and sponges being about half of the whole amount used for the sack of flour, this amount is about 60 quarts, varying somewhat with the character of the flour. Thus, up to and including the "sponge," one-fourth—or one-third, according to some bakers—of the flour and some 30 to 32 quarts of water have been used.

In the preparation of the sponge, some bakers—not many, but still some who occupy a prominent position in the trade—add a part of the salt, I have been told, about one-half of the total salt; but probably this will depend entirely upon the temperature, as for example, whether it is winter time or summer. The object of the salt is to check somewhat the activity of the ferment, and I shall presently allude to this matter again, because many bakers do not adopt the plan of adding salt at this particular stage.

The sponge being made, it is allowed to go on fermenting for some time. At the end of about an hour it increases visibly in size, and this increase, due to the production of carbonic acid gas, causes it, at the end of about five hours, to "break." When the mass has risen to its fullest extent, the sponge breaks, owing to the escape of some of the carbonic acid gas, and having broken and fallen down it commences to rise again, and in about another hour, varying somewhat, according to the temperature at the time, or of the room, the sponge rises again, and breaks again. This is called the second break. So soon as it has broken the second time, the remaining part of the flour—which would be about three-fourths, or two thirds, according to the practice followed by the baker—and the remainder of the water are added.

We pass thus to the dough. The remainder of the flour having been added, and the re-

mainder of the water, the whole is thoroughly well mixed, and it is at this stage when most bakers add the whole of the salt. Other bakers only use that which remains over, after having employed a little at the sponge stage. The total quantity of salt used I find to be about three pounds to the sack, or 48 ounces, which would give about half an ounce of salt to the four-pound loaf of bread. This part of the operation of bread-making entails a very great deal of hard manual labor, and it has, therefore, often been proposed that one should introduce machinery, with a view to lessening the amount of mechanical labor. There was exhibited at our last meeting an instrument, the invention of Mr. Pfeleiderer, which seems to be a very successful piece of machinery. My business, however, is not to discuss the mechanical advantages of this piece of machinery or that, but rather to confine myself to the chemical phenomena. I did hear an objection, to it, that, in order to be a really useful instrument, it would require to have other power than manual, but those of you who are practically interested in the matter must judge of this for yourselves.

The dough having been thoroughly well worked is now left for one hour in order to rise again. It is then scaled; that is, it is cut and weighed off in proper quantity and made up into loaves. By the time a large batch of bread has been scaled and made up, of course, the previous portions are ready for the oven. They are then put into the oven, and are there heated for about an hour and a half, the temperature of the oven at the time of the introduction of the bread varying from 400 deg. Fahr. to 450 deg. Fahr. Of course, this is not the temperature of the bread, because the bread contains water, and therefore, it rises little, if at all, above the ordinary temperature of boiling water.

There are some modifications of this process as just described. First of all, some bakers use the whole of the salt in the stage which is called the preparation of the dough; whereas, as I have pointed out, some use a portion of the salt at an earlier stage, namely in the sponge stage. Again, some use a thicker sponge; some use as much as one-third of the total flour, and others only one-fourth. Again some employ what is called patent yeast, instead of brewers' yeast. Patent yeast is made by taking an infusion of malt and boiling that with hops, and then, when it is sufficiently cooled, yeast is added, and in that way young active yeast cells are formed. Those who employ patent yeast take, I believe, about 6 pounds—in winter 7 pounds—to the sack of flour. One other point to which I need only briefly allude, is the preparation of what are called fancy breads, more especially the beautiful rolls and loaves introduced during the last few years to the London public in imitation of the bread made in Vienna, and afterwards in Paris. These fancy breads are fermented, not with the ordinary brewers' yeast, but with German yeast; and the process—as I understand followed by almost every one—is, to make the "ferment" first. This ferment is made with potatoes, and also with brewers' yeast, as usual, but, in the sponge stage, German yeast is employed, and a considerable quantity, so that the fermentation is very rapid, and thus one obtains very large, light and porous bread.

I will now briefly consider the chemical changes of the process. In the first place, in the preparation of the ferment, I said that potato, or fruit, as it is technical termed in the trade, is employed. Now, this is not used for the purpose of adulteration, nor is it used for the purpose of increasing the profit. On the contrary, very often the baker has to give a very much greater price for the starch in the potato than for the starch in flour or in rice, for it would be cheaper for him to buy cereals for this purpose. His object is this. With the exception of the Maranta arrowroot and the "Tous les mois" arrowroot, potato starch is the largest of the starches, and it readily lends itself to the expansive action which takes place in boiling. On bursting, the granule matter, the starchy matter of the cell, exudes from the ruptured cell-wall, as I have pointed out to you before; and it is only on the starch after it has been made in this soluble form that the soluble ferments of the yeast can act. Therefore, the baker has found out for himself long before science could have taught him—I do not know how old the custom is, but certainly long before science could have taught him—the baker found out for himself the advantage of using a small weight of potatoes to develop the fermenting organisms required to do the work of converting a sack of 380 pounds of flour into bread. Now, in 8 pounds of potatoes there is only, at-

the very outside, one-fifth of its weight of starch and one-fifth of 18 pounds is but a very small quantity when dealing with 380 pounds of flour; and manifestly then this arises from some other reason than a desire to substitute a cheap material for a dearer. Its real value is to enable the baker to obtain an active propagation of the yeast and to enable him to get a larger quantity of sugars and dextrin formed in a given quantity of time than if he were to employ flour only. I believe in some cases bakers also scald a little flour, in order to obtain some soluble starch in that way, in addition to the employment of potato. During the preparation of the ferment, which lasts something like eight hours, there is a continuous action, to which I called your attention at the last meeting, when I showed you, from the analysis of Mr. Henry Brown, that soluble albuminoids, in the presence of moisture at about 100 degrees, and also at 85 degrees, gradually become degraded, less and less complex, and, therefore, more and more mobile; and this action converts soluble starch into those more hydrated products, maltose and dextrin, which I described to you at our second meeting.

The ferment having been much increased by the treatment with the potato and the small quantity of flour employed, the next stage is the preparation of the sponge. Here the baker adds a portion of the flour, either one-third or one-fourth, according to his custom, and of course a portion of water. This is thoroughly intermixed, and so the fermenting action goes on; partly upon the sugars already formed in the first or fermenting stage, and partly also (and to a great extent with inferior flours) upon the albuminoids and starch of the flour added in stirring the sponge.

The third stage is what I will call, chemically the inactive stage. I do not mean to say that no change goes on, but that as compared with the very great chemical activity of the fermenting stage, and the powerful fermenting activity of the sponge stage, we may call the dough stage—when it is made thick and firm, and when salt is added in order to check further action—the inert stage, the object now being that there shall be no more degradation of the albuminoids, no more breaking up of the complex starch into simpler molecular groupings. Sufficient of the sugar has been formed to carry on all that is required at this particular stage. The period given for the carrying on of the fermentation is only about an hour, and then the dough is put into the oven in order that the action shall be stopped; but of course, before it is stopped, the temperature acts on the globules of carbonic acid gas; they expand under the heat, and so they lift the bread, and they are able to lift it on account of the resisting elastic property which the gluten of the wheat possesses.

The first object aimed at by the baker in the process of bread making, is to get a thoroughly good aeration of the finished bread, so that it shall be light, not heavy, that the air spaces which lighten it shall not be large, but that there shall be a large quantity of smaller air spaces, and to obtain, in other words, a well piled, well aerated bread. The next point the baker aims at, is to have as little color produced in the panification process and in the oven process as possible, and his object in endeavoring to obtain as little as possible of colored products is doubtless derived from the fact that inferior flours are eminently prone to give colored products, and the world at large has come to conclude that high colored bread is due of course to inferior flour. These are by no means the objects that the baker has in view, he also desires to obtain a loaf that has a nice aroma, and a sweet—I think they call it a "nutty" taste on the palate.

The use of salt is a very interesting discovery on the part of the unscientific baker. The baker found out the value of it long ago, and also in this case before there was any science to tell him of it. In a very interesting lecture delivered some years ago by Mr. Callard, a baker of well recognized eminence in the trade it was pointed out that the salt might be compared to the bridle and the yeast to the whip, that the one was a check on the other, and that by a judicious use of salt at the different stages, one could guide and arrest the fermentation.

I proceed now to a matter which must have arisen in the minds of all of you. What is the cause of fermentation? To what is this production of carbonic acid gas due, and to what is the production of alcohol which is always noticed in the fermentation of bread due? I will not detain you long with a matter which has interested scientific men for many years; but, inasmuch as it is an exceedingly interesting branch of science, I think it well

to give you a short account of the various views which have been held upon this question, and to point out to you the knowledge we now possess in regard to it. The first philosophical explanation of alcoholic fermentation was that given by Stahl and Willis. They said that alcoholic fermentation was due to a peculiar motion imparted from the degrading body to a body in its neighborhood, and the body receiving this peculiar impulse or motion was degraded from a complex structure to structures more and more simple. This idea that a body having a peculiar kind of motion or vibration can communicate to another body in its neighborhood the same kind of vibration or motion is certainly not unphilosophical. For example, if we were to take a rod of iron—say a small poker—and suspend it by a string in the middle of the room, so that the pointed end would be directed to this side of the room, which is the north side, and were then to tap the poker for a short time with a small hammer, or piece of wood even, we should find that the poker becomes possessed of properties which it did not manifest before. Thus, if we were to suspend it in any other room in London, or in England, the pointed end would be directed to the north side of the room when free to swing. The extent to which it would manifest this peculiar property would depend on the amount of tapping, and the conditions observed by the operator, and for a time the poker would retain this peculiar tendency of pointing north and south.

Now, by this peculiar mode of tapping the poker, we set up a number of vibrations, which would under ordinary circumstances produce no manifest effect on the poker, but because we placed the poker at right angles to the diurnal rotation of the earth, then we have those rotations compelled to take a peculiar, and as we term it, polar arrangement so that the vibrations circle round the axis of a poker, and the result is that for some time, the poker acts as a magnetic needle. In much the same way if I had a large finger glass, and if I were to strike a particular note on the string of a fiddle I could compel that glass, supposing I knew its dominant key, also to give forth the same note as the one I had produced from the string of the fiddle. Doubtless there are many other instances you may yourselves think of in support of the idea of Stahl and Willis. This idea was taken up by Liebig and by others, who developed it to a considerable extent. Liebig said that the peculiar kind of motion was an oxidation action, that it was due to the oxidation of complex albuminoids, and by the oxidation of albuminoids he accounted for alcoholic fermentation of saccharine molecules, and for the fact that the sugars, therefore, were broken up into alcohol and carbonic acid, or at a higher temperature, into lactic acid and acetic acid. The views of Stahl and Willis would, at the present day, account for the peculiar action of the hydration of starch, but it certainly does not account for the alcoholic fermentation. While these views were held so recently, strangely enough, in 1680, a Dutchman, Leuwenhoek, contended that the yeast consisted of minute globules. The matter was forgotten, however—for microscopes in those days were not of very great power—until the year 1837, when Cagnard de la Tour, and also Schwann, corroborated by Kützing, distinctly proved that yeast was a cellular organism. But the great workman in this field of investigation has been Pasteur, to whose labors throughout a long period of his life—labors carried out even at the sacrifice, to a great extent, of his health, and certainly to the injury of his sight—we owe the true clue to the nature of alcoholic and many other fermentations. The problem whence come ferments, has been to a great extent, answered by Pasteur. If you take an ordinary grape, well-grown in the south of Europe, you will find a beautiful bloom upon it. That bloom partly consists of minute organisms and dust that has fallen onto the skin of the grape. Now, Pasteur proved that it was this dust adhering to the outside of the grape that set up fermentation in the expressed juice of the grape. I will not detain you by a long account of his work, but I will merely say that, in the first place he so arranged his experiment that he could take from the inside of the grape a part of the juice without any trace of the dust on the skin coming in contact with it. He found, when that juice was put in small tubes, and in tubes which had been previously heated so that there should be no trace of organized dust existing in them, and with proper means taken to prevent any more dust getting into such a tube the juice would not ferment. On the other hand, when he took a small portion of the dust of the skin of the grape, and added it to the juice from the interior of the grape,

he got vinous fermentation. The juice was converted into wine by alcoholic fermentation. Not only does the grape contain this minute ferment on the skin, but also the dust of the air generally contains the spores of ferments, and ferments themselves which may produce alcoholic, butyric, ropy, or other kinds of fermentation. Not long ago, in England, it was customary in Dorsetshire to allow the wort made from malt to spontaneously ferment, and if you go over to Brussels, even at the present day, you will find their beers well-known in Belgium under the names of Lambic and Faro, produced by spontaneous fermentation. After the wort has been made it is placed in large tuns, and whatever dust falls from the atmosphere goes into the large hole at the top, and sets up fermentation. The old process of making bread by means of leaven was also a haphazard process of the same kind; that is, you could not predict exactly what kind of organism would follow. The result, is, as you know, that the old leavened bread was certainly by no means a sweet, pleasant bread, and those who have had the misfortune to drink Mambie and Faro must know how sour and bad they are.

I said that the old leaven contains alcoholic organisms. These have been carefully examined by Engel, and he has given them the term *Saccharomyces minor*, because they are smaller than the ordinary beer yeast, called *Saccharomyces cerevisiae*. These names may seem somewhat long for organisms so small. I am unable to make use of simpler terms, however, without running the risk of confusion. The *Saccharomyces minor*, discovered by Engel in leaven, measures only $\frac{1}{1000}$ th of an inch in diameter. It is an alcoholic organism, and produces spirit and carbonic acid like the ordinary beer yeast; at present, however, we have no knowledge of the ratio of alcohol to gas. Along with these organisms in leaven occur also the common beer yeast, and numerous organisms of disease, producing lactic, acetic, and butyric acids, also the ropy organisms; indeed, left to chance as the leaven process is, we may expect numerous sources of diseased action. Thus, the spontaneous fermentation of bread (and the leaven process is eventually this) as the Belgian beer, leaves as the sport of chance.

The dust of the air contains organisms of various kinds; thus, in a short time, a piece of moist bread becomes covered with mould; our boots, if put away in a damp place, become covered with mould, and these moulds consist of different organisms, readily enough distinguished from each other, and to which different names have been given. One is the *Penicillium glaucum*, another *Aspergillus*, and others are different species of *Mucor*. These all convert starch into carbonic acid, providing they are growing in the air; but, if you submerge them in a saccharine liquid, they no longer can breathe the oxygen of the atmosphere by which they were able to convert starch into carbonic acid and water; they are deprived of their oxygen, or, at any rate in a very short time the amount of the dissolved air in the saccharine liquid is used up by them, and the result is that they are compelled to obtain their oxygen from the decomposition of the sugar itself. In getting oxygen from the decomposition of the sugar they convert the remaining portion of it into carbonic acid and alcohol.

The ordinary mother of beer, called by scientific men *mycoderma cerevisiae*, the organism that converts beer into carbonic acid and water if submerged in a fresh solution of barley malt sets up a slow alcoholic fermentation with the production of carbonic acid and alcohol. And so with other cell structures; not only is this the case with organism such as I am speaking of, but even the cells of the sprouted barley, or of sprouted wheat, or the cells of an apple, act in the same way. If you were to take a sample of sprouted barley, and put that into a bottle, after a week you would find on opening the stopper a great rush of carbonic acid, with a strong aroma of alcohol, together with some ethers. The same takes place with fruits undergoing spontaneous decomposition. There is a difference, however, between the action of the cells of vegetable organisms and the yeast cells, such as I have called your attention to this evening, in that they are not able to reproduce—they do not increase; on the contrary, they die; and, therefore, the amount of alcoholic fermentation produced by the cells of the sprouted barley, or the cells of fruits, is comparatively limited.

The conditions requisite for the vigorous action of yeast, and the vigorous growth of yeast, are these: First of all, a certain amount of air is required. I said just now that the organism was compelled to obtain its oxygen

from the decomposition of the sugar; but, if you deal with an organism you have submerged under these conditions, the amount of alcohol produced is certainly great compared with the ratio of its weight to the whole weight of the yeast produced, but the amount of work absolutely done is comparatively small; whereas, by the aeration, to some extent, of the liquid, or by employment of organisms that have previously been exposed to the air, there is a much greater activity.

The next matter of importance for their vigor is the presence of soluble albuminoids. True it is, of course, that Pasteur has shown that the yeast organism is able to attack ammoniacal salts, and to convert them into the protein compounds of its own structure. That is quite correct; but I am speaking rather from a technical point of view, and in that point of view the presence of albuminoids is necessary to active fermentation, whether of beer or bread.

The next essential is the presence of sugars. There must be sugars present in order to undergo decomposition, producing carbonic acid and alcohol, and also to enable the yeast organisms, as they are multiplying, to build up new cell structures by the cellulose formed from the decomposition of the sugar. Nine-tenths of the weight of ordinary yeast, when well dried, consists of albuminoid substances, the other tenth being matters derived from the sugar.

We have seen that dust contains the spores of many organisms, and it becomes necessary, when using ferments—obtained from beer, for example—for the baker that he should see whether the yeast which he has got, contains the particular alcoholic organisms which he wants, or whether it contains a large number of other organisms that produce acidity—produce, in other words, decomposition of a kind unfavorable to his bread making process. I have here, on the wall, diagrams representing ordinary English brewer's yeast, the cells of which are circular in character; there is Burton yeast, which is evoid in character; another one represents ordinary yeast which has remained for a considerable time in a liquid after the fermentation has been completed. Such an exhausted liquid is unfit of course for the continual growth and propagation of the organisms, and you will notice that the organisms show distinct granulation; these granulations may be noticed in young active yeast cells, but less distinctly than in the old exhausted cells, in which the protoplasm has been used up in the struggle for existence.

I am afraid some of you at a distance cannot see very distinctly in these diagrams the characteristics of the different organisms, but I have placed on the table more than a dozen preparations, which you can examine with the microscope, showing the different appearance of the organisms which produce healthy alcoholic fermentation, and also those producing the lactic, acetic, butyric, and ropy fermentations.

Under ordinary circumstances, the yeast ferment converts 100 parts of sugar into 51 parts of alcohol and 49 parts of carbonic acid, and 5 parts of glycerine, succinic acid, and other products. The ropy organism converts 100 parts of sugar into 51 parts of a peculiar viscous, gummy body, called manite, 45 of gum, and 4 of carbonic acid. This ropy organism, then, converts saccharine liquids into a thick, oily, viscous mass, and occasionally it happens with a brewer, in the preparation of beer, that a beer which was previously perfectly bright and limpid, pours out as if it were almost like treacle, and, if such diseased kind of yeast be given to a baker, he must expect a similar kind of unfavorable action on the saccharine matter he has made in his previous panification process.

If you take one of these peculiar organisms of mould, the mucors, and submerge it in a saccharine liquid, it begins to form separate cells, in the way shown on the drawing; ultimately they break up, and they all act much in the same way, though not with the same energy as the ordinary English brewer's yeast. I have not got a representation on the wall of German yeast, but it much resembles the Burton, being evoid in character. You will see an example under one of the microscopes.

London bakers, I am told, find that yeast from certain breweries is much superior to yeast obtained from others. Indeed, I learn that many of them are obliged to go out of London to the more old fashioned breweries in order to get the kind of yeast they require. This is probably due to the fact that in the older breweries a different method of fermentation is carried on; the cleansing system, as it is technically termed, is adopted, and not the skimming system; but with the skimming

system carried on carefully, with the microscope, one can obtain as pure yeast as by what is called "cleansing," where the fermentation is begun and carried on in large vessels down to a certain stage, about one-half, and then it is placed in smaller vessels, and there the fermentation is continued by the yeast forcing its way through the bung-hole. In Burton, they use a combination of the small vessels, termed unions. Bitter-ale yeast is not so well adapted for bread making as mild-ale yeast; for this reason, that a large quantity of hop has been employed in the process, and the tannic acid in the hop, together with the oil, are inimical to the activity of the yeast. Consequently, the yeast obtained from very highly-hopped ales is not so well adapted for the baker as that obtained from less hopped ales.

I spoke just now of the patent yeast; and it is somewhat singular to find that hops are always used in its production. Indeed, I have been told by more than one, if we were not to use hops in dealing with malt, it would be impossible to get any yeast formed, and that if we were to add yeast to an infusion of malt prepared without hops we could not get yeast formed. Of course this is erroneous. It is not much more than three centuries ago that hops were first introduced into England. Old English ale was not made with hops. The use of hops is to aid the keeping qualities of the yeast, by preventing too rapid decay.

German yeast is very largely used in England now. It is not a yeast which comes up to the surface of the beer in the same way as ours; on the contrary, it is a yeast which settles to the bottom, and, therefore, that form of fermentation is called "bottom fermentation," whereas ours is called "top fermentation," but, in their chemical action, there is no essential difference between them. In each case they convert saccharine matter into carbonic acid and alcohol, and in the same ratio. On reference to the board of trade returns, I find that the year 1876 we imported £406,000 worth of yeast from foreign countries; in 1877, £437,000, and in 1878, £468,000; so, apparently, the traffic is slowly increasing. When I tell you that in many parts of England brewers' yeast is a drug, and that there is not sufficient demand for it, it does seem that we ought to find some means of making English top yeast into a useful servant to the baker, instead of wasting it, and having to purchase other yeast from Germany. It is perfectly easy, with English top yeast, to secure, on the one hand, that it shall be a quick-growing, active yeast, like the German; or, on the other hand, that it shall be slow in its action, such as ordinary brewers' yeast.

Good flour and good yeast, in the hands of a good baker, will, of course, give us good bread. But, after all, when the council of the Society of Arts did me the honor to ask me to give a course of lectures on the chemistry of bread making, they were not limiting their thoughts to the west end of London. A society like ours thinks not merely of the west end of London, but of all England; and we have to consider, and I have more than once pointed out, that we have, unfortunately too often, bad harvests, and therefore bad flours. Then, again, there are many bakers in country places, and, perhaps, one need not go so very far away to find those, who certainly require some extra assistance in understanding the very complex phenomena underlying their art. I called your attention to the fact, you will remember, that in our bad harvests, the peculiarity of our wheats was not there was any deficiency in the total percentage of albuminoids, but that there was a less percentage of the tough, elastic, valuable, bread making gluten; and I then said something might be done by a partial kiln drying of the wheat, and by so drying the flour afterwards, that it should not be ready to undergo the degradation due to moisture which often occurs.

In the process of fermentation, which I have briefly described to you, we have seen that in the sponge stage, a considerable quantity of the flour is left to undergo the degrading action set up by the yeast on the soluble albuminoids already there; manifestly then, inferior flours should not be submitted to such a panification process, for two reasons. In the first place, there is a want of the proper elastic matter in the bread; secondly, a large amount of coloring matters is obtained in the fermentation. If you will refer to this table of Oudemans' showing the action of a high temperature on the albuminoids of wheat, you will find that, when malt undergoes a kiln-drying action, which is at a temperature certainly lower than of the oven, there are 7.8 per cent. of torrifaction products.

COMPOSITION OF BARLEY AND MALT.
(OUDEMANS).

| | BARLEY | | MALT | |
|------------------------|------------|--------------|-------------|-------------|
| | Air Dried. | Water Dried. | Kiln Dried. | Kiln Dried. |
| Starch | 67.0 | 68.1 | 58.6 | 47.8 |
| Dextrin | 5.6 | 8.0 | 6.8 | 10.2 |
| Sugar | 0.0 | 0.5 | 0.7 | 0.9 |
| Cellulose | 9.6 | 14.4 | 10.8 | 11.5 |
| Albuminous matters | 12.1 | 13.6 | 10.4 | 10.5 |
| Fatty matters | 2.6 | 2.2 | 2.4 | 2.6 |
| Ash, etc. | 3.1 | 3.2 | 2.7 | 2.7 |
| Torrification products | 0.0 | 0.0 | 7.8 | 14.0 |

These are formed, to a great extent, from the destruction of the albuminous matters; they are also partly formed by the action of heat on the saccharine matters. At a still higher temperature in what is called "high dried" malt, we have no less than 14 per cent. of torrifaction products, but those colored products are almost entirely due to the action of heat on the degraded forms of albuminoid matters, and on the dextrin and maltose formed. Manifestly, therefore, the inferior wheats should not be submitted to the panification process. That was the conclusion come to some years ago by Dr. Daugleish, and he devised a system by which one may employ inferior wheats by using carbonic acid made in other ways, and not by the action of the yeast organism upon the flour. Of course, tastes differ. I do not know how many of you like aerated bread, but personally I do not like it. There is a want, to my taste, of that nice sweet flavor one gets by the fermentation process. Those who like aerated bread have certainly an excellent means of using inferior flours; but for those who wish to have the peculiar aroma which is brought about by fermentation, the problem presents itself, how shall we have carbonic acid manufactured in the ordinary fermentation process, and yet not obtain the highly colored products which are formed when we carry on that process with inferior flours?

It seems to me that we can get over the difficulty by not allowing these inferior flours to be submitted to the action of the albuminoids of yeast, and therefore, that in our preparation of the ferment we should use the best potatoes and the best flour. I did suggest that it was worth while to try the effect of using the sugar called dextrose in conjunction with potato, and one might also suggest that the potato starch, which comes so largely from America and elsewhere, and which can be bought at 21 per cent., might be used along with or in place of potatoes. But in the second stage, I think the important change to make is this: that we should use, for what is called by the baker the sponge stage of the fermentation, where it remains eight hours, a quarter of the flour, and not allow the flour of the sponge to be inferior, so as to undergo this very serious degradation by which an unpleasant form of bread is obtained, and a high color. It seems to me, that in this stage one ought to use flour made from well matured wheats, and that when we come to the comparative inert stage, which only lasts for a short time, and in the presence of a comparatively small ratio of water, that then we should make use of our inferior flours, if we should be so unfortunate as to have them. I suggest this as a method by which we may improve, not merely the appearance of the bread, but also its digestibility, because a heavy sodden bread is not the kind of bread that lends itself readily to the subsequent stages of fermentation, which I shall have to draw your attention to.

[At the conclusion of the lecture, Professor Graham drew attention to a series of preparations of yeast organisms and starches, placed under microscopes, kindly lent for the purpose by Mr. Crouch, of 66, Barbican, London. He stated that these powerful microscopes, with an 1/8th objective, condenser and other appliances, cost £7 each, and were marvels of excellence and cheapness.]

THE BEST VEHICLE.—An anecdote is told of a physician who was called to a foreign family to prescribe for a case of incipient consumption. He gave them a prescription for pills, and wrote the direction: "One pill to be taken three times a day, in any convenient vehicle." The family looked in the dictionary to get at the meaning of the prescription. They got on well until they got to the word vehicle. They found "cart, wagon, carriage, buggy, wheelbarrow." After grave consideration they came to the conclusion that the doctor meant the patient should ride out, and while in the vehicle he should take the pill. He followed the advice to the letter, and in a few weeks the fresh air and exercise secured the advantage which otherwise might not have come.

Minnesota Millers' Association.

ANNUAL MEETING.

The Minnesota State Millers' Association met at the Nicollet House in Minneapolis April 13, 1880, and when the meeting was called to order by President Brown, the following gentlemen were found present:

D. R. Barber, E. R. Barber, L. Fletcher, Fred Pillsbury, L. Christian, John Crosby, H. G. J. Crosswell, J. A. Christian, E. V. White, W. F. Cahill, F. S. Hinkle, Frank Holmes, F. L. Greenleaf, C. T. Hobart, Geo. A. Pillsbury, S. W. Goodrich, William Pettit and G. Shober, Minneapolis; W. P. Brown, E. L. Baker, A. Seebach and Robert Taylor, Red Wing; F. D. Foss, Jordan; E. H. Riedell, Owatonna; J. H. Townsend, David Bronsen, Stillwater; and Mr. Snouffer, President of the Iowa State Association.

The minutes of the last meetings, special and regular, were read and approved.

Capt. E. L. Baker moved, at the request, he stated, of Capt. John T. Ames, that the firm of Jesse Ames' Sons, of Northfield, be reinstated as members of the Association upon payment of all past dues. The motion was adopted, and Capt. Ames was brought into the convention and introduced as the prodigal son.

THE SECRETARY'S REPORT.

The Secretary submitted his annual report as follows:

MILWAUKEE, April 10, 1880.—*Minnesota Millers' State Association:* Mr. PRESIDENT and GENTLEMEN—At the last "annual meeting" of our State Association held April 8, 1879, I had the honor to report a membership of one hundred and four firms owning and operating six hundred and twenty-three run of burs. At that meeting it was decided to reorganize our Association upon a more solid foundation, and to that end a new constitution legally binding the members to stand by the organization for a term of ten years was unanimously adopted by all members present. This constitution was printed and a copy forwarded to each member for his signature. Ninety-eight members formerly operating six hundred and two run of stones have signed and returned the copies sent them reporting in their mill plant an aggregate addition of twenty-seven run, making six hundred and twenty-nine. Four additional mills—Messrs. Cahill & Fletcher, Boston Elevator & Flour Mill Co., Mankato Mill Co., and E. V. White & Co., operating forty run of stones, have since joined the organization and signed the constitution; and one mill, belonging to Messrs. Gooding & Allis (six run of stones) has been destroyed by fire, and the owners have requested that they be released from their obligations to the Association in accordance to section nine of constitution (see their letter of Feb. 13). This leaves our present membership numbering one hundred and one firms, operating six hundred and seventy-three run of stones, the largest by more than a third of any organization represented in the National Association. Messrs. Sherman & Windship, Owatonna; Valentines & Tew, Rushford; W. D. Hayward, St. Cloud; Albright Bros., Glencoe; S. T. Dickson, Chatfield; and Fred Keys, Frontenac, have thus far neglected to sign the constitution, though repeatedly urged to do so. As to the "legal department" of our organization: The so-called "Cochrane suit" has been appealed by Consolidated M. P. Company to the United States Supreme Court, where Mr. Harding is looking after it, and judging by the past it is in safe hands and we need have no anxiety as to the result.

"The Traveling Brush" question was settled by the "Chicago compromise," and I believe nearly all of our members using brush machines have availed themselves of the terms and thus rid themselves of a long vexing question.

The Denchfield suit is now being contested by the Association. Several suits are pending in Illinois and many more in New York, where the real battle has to be fought. In response to my letter to Mr. Selden, Feb. 11, as to the history of the work on that field since last May, he replied as follows: "There were pending in this district in May last the following suits under the Denchfield patent against members of the Millers' Association, viz., Herring vs. Gage. This was the first suit, and in it an appeal has been taken to the Supreme Court. I think I have been once (and perhaps twice) in Utica on business connected with this case since May, and the appeal has been perfected and appearance for appellants entered by Mr. Harding; Herring vs. Hinde and six other cases against millers in this city. These are the 'defaulted' cases. Nothing has been done in these since May last."

"The complainant has done nothing toward assessing damages, and probably will do nothing for some time to come. There was also pending in May last the following suits: Bagnall vs. Thornton & Chester, Buffalo; Same vs. Harvey & Henry, Buffalo; Same vs. G. Wilson et al., Rochester; Same vs. Elwood & Co., Rochester; Same vs. Rodde et al., Ogdensburg; and Same vs. Brown & Co., Ogdensburg. Since May last the following proceedings have been had in these cases: June 4, 1879, testimony was taken for defense at Rochester, and June 24 to 28 inclusive, ditto. This testimony referred principally to the Cartier and Robinson patents, and to the Cartier experiment which had been previously tried in the Arcade Mills in this city. A working Cartier apparatus was built and

practically tested for upwards of a month alongside of the Denchfield device, and the simplest of the curb suction. This testimony included the evidence of Rider, French translator; Clement, expert; Sprague, head miller; Ashton and Ayers, head millers from other mills. This testimony also included the introduction of a large number of patents and printed publications, including many translations from the French language. This testimony has been printed and some of the exhibits. It covers about one hundred pages, and exhibits will make one-half more. This testimony was also taken in the Illinois cases in which Mickles is plaintiff and Mr. Gridley solicitor for defendants. Mr. Gridley has printed copies of the testimony in his cases. From June to November 1 the taking of further testimony by defendants was adjourned from time to time at complainant's request. I had made and introduced models of Cartier, Robinson Fevay patents and one or two more, and also a model of Arcade Mills, in accordance with instructions from Mr. Harding. I sent all models and papers to New York about Nov. 1, 1879. There were various delays in going on with Mr. E. S. Renwick's testimony for defendants, owing principally to his engagements or Mr. Harding's. I opposed Jenney's motion to compel us to close proofs, and finally, after having occupied twelve or fourteen days during the months of December, January and February, our case was closed Feb. 15. In rebuttal, the complainant occupied seven days, and says he is not quite closed.

"The cases may be heard in May; if not, they will probably go over to September or October.

"Since the expiration of the patent no mill company, so far as I know, has gone back to the use of the Denchfield apparatus. The curb suction on a comparative trial have proved much more economical and equally effective.

"Whatever the result of the cases may be, nothing will ever convince me that both Robinson and Cartier had the substance of the Denchfield apparatus in their minds in taking out their patents, and Mr. Harding affirms positively that the complainants can never assess any damages even if they get a decree for infringement. Unless the complainants develop some more tenable theory on the argument than they have in rebuttal, success on our part seems to be a foregone conclusion. The construction of the patent adopted by the complainants, except H. B. Renwick, leaves five of the defendants out of the infringement. I understand all this last testimony will be stipulated into Gridley's cases.

Neither the Robinson or Cartier patents were in the former cases."

Again, under date March 27, he writes: "Jenney has obtained an order from the court allowing him to take more testimony on the subject of infringement—we to rebut for fifteen days, and Judge Blatchford has said he will hear the cases May 4."

I beg leave once more to call the attention of the Association to the subject of insurance for our mills. Many of the State Associations are already doing practical work in this direction, and have at least demonstrated that much can be done to lighten this burden. A committee was appointed (J. A. Christian, chairman), at the regular meeting held May 8, 1878, but I think it has never been called upon for a report.

At our last meeting much interest was manifested on the subject of seed wheat, and a committee appointed, C. A. Pillsbury, chairman, to report at this meeting. Also a committee on by-laws, F. S. Hinkle, chairman.

The Cincinnati exposition next June promises to be a grand success. I learn to-day that more room for machinery is asked for than can be granted, nearly twice over. Some who gave it the cold shoulder on the start are now begging for room. Many of the State organizations are already at work, and Minnesota cannot afford to be behind. And here let me correct a false impression that has come to my ears, that "all agricultural products exhibited become the property of the managers;" while the truth is, it is only that entered for competition for premiums. All other property belongs to the exhibitors.

Respectfully, F. B. MILLS, Secretary.

Mr. Cahill brought attention to the misstatement in the report that a great many had availed themselves of the terms for the settlement of the brush claims, and moved that the clause relating to that subject be stricken out, which motion was adopted.

Mr. J. A. Christian submitted his report as Treasurer, which shows the following facts:

Balance on hand April 17, 1879.....\$3,834 94
Collections during the year.....3,201 16
Total.....\$7,036 00

ASSETS.
Cash in Northwestern National Bank.....\$ 59 01
Certificate of deposit.....3,000 00
Certificate of deposit.....1,400 00

Amount due National Millers' Association.....\$4,519 01
Amount audited by National Millers' Association since last report.....2,506 84

Total.....\$7,036 00
Less credit by assessment of May, 1879, \$10 per run on 680 run of stone.....\$6,600 00

Balance due this date.....\$ 436 00
Total assets April 13, 1880.....\$7,472 00

In submitting his annual report, Mr. Christian stated that he could not serve in the future, and begged to be relieved from further active official duty in the affairs of the Association. He was tendered a vote of thanks on motion for his valuable and efficient services in conjunction with the office of Treasurer.

BY-LAWS.

The committee on by-laws submitted their

report, which was read section by section and approved.

Section 1 provides that all legalized members shall be entitled to a vote.

Section 2 makes persons engaged in milling eligible to membership.

Section 3 fixes the time of holding the annual meeting on the second Tuesday of April of each year.

Section 4 provides for special meetings on call of ten members of the Association.

Section 5 prescribes the order of business.

Section 6 provides for a President, Vice-President, Secretary, Treasurer and Executive Committee of four to be elected by ballot.

Section 7 fixes the duties of officers.

Section 8 makes it the duty of members to furnish statistics to the Secretary.

Section 9 provides that failure to pay dues will work forfeiture of membership.

Section 10 provides that applicants for membership during the year may enjoy benefits of the Association by payment of initiation fee, the sum to be returned if the application is rejected.

Section 11 provides for the amendment, enlargement, etc., of the by-laws.

The report was adopted.

The officers were then elected for the ensuing year:

President—W. P. Brown, Red Wing,

Vice-Presidents—David Bronson, Stillwater; Geo. A. Pillsbury, Minneapolis.

Secretary—Francis S. Hinkle.

Treasurer—W. F. Cahill.

Executive Committee—C. A. Pillsbury, Chairman; W. H. Dunwoody and H. G. J. Crosswell.

The Association then took up the subject of the Cincinnati Exposition, and Mr. Cahill opposed co-operation in that enterprise. He thought it would be damaging to the milling interests of Minnesota because it was a proposition to lay before the millers of England and Scotland our process of manufacturing flour—of saying to them, in fact, here is the way we make flour; you are welcome to it.

Mr. George A. Pillsbury took much the same view of it, and thought the proposition was ill-advised, and detrimental to the interests of milling in Minnesota.

Mr. Frank Greenleaf spoke in the same vein, and said he was in favor of taking no notice of the proposition whatever.

Mr. Fletcher asked if the exposition was under the control of the National Association.

Mr. Christian stated that Messrs. Smith and Bain, of the Executive Committee of the National Association, had been authorized to take the matter in hand, but there would be no expense upon the part of the Association. He stated that the National Association Convention was to be held in Cincinnati at the same time.

Mr. Fletcher thought it was important that the very best committee that could be appointed should be sent to that convention.

It was stated during the informal discussion that it had been stated in the English milling journals that the mills of Minneapolis would be open to the visitors.

Mr. Fletcher thought that the Association should take action which would undeceive the foreign millers on this point.

Mr. Dunwoody thought we could lose nothing by allowing the foreign millers to visit our own mills because it would tend to popularize good flour, and we can make so much better in any event that it will make a better market for our flour.

Mr. Fletcher thought the foreigners needed to be educated, but he wanted the right ones educated instead of the wrong ones—not the ones who have kept us out of the market so long.

Mr. Baker stated that the millers who were coming to America were the best customers of the mills of this country, as they were largely the bakers as well as the manufacturers of flour, or else practically control the bakers' business.

Mr. Greenleaf stated that he had had a conversation with an English miller, who stated that the American flour had forced the manufacturers in England to make a better grade than they have been making, and with that in view gathered daily samples of our desirable products to bring their grades up to.

Mr. Pillsbury said it had always been the policy of the English to manufacture from the raw material, and they desired to do it now, and even though they are our best customers now, are not so willingly.

No action was taken.

The following delegation to the National Convention, to meet in June at Cincinnati, was appointed: W. P. Brown, Francis S. Hinkle, John T. Ames, John Crosby, J. H. Townsend, J. A. Christian and L. Fletcher.

The committee was empowered to appoint alternates.

Capt. E. L. Baker offered the following resolution:

Resolved, That because there is not enough of wheat in the State to supply the mills until a new crop is secured, and too much flour at present upon the market for profit, we will close our mills for one month from and after April 20th next, and we recommend a similar action to other State Associations and millers generally.

The resolution was discussed at length, but did not meet with favor because various mills did not believe they could enter into an arrangement which might disappoint their order trade.

The convention then adjourned until one year hence.

Wisconsin State Millers' Association.

The fourth annual meeting of the Wisconsin State Millers' Association took place in the parlors of the Newhall House, Milwaukee, at 2 o'clock P. M. Tuesday, April 18th. President Edward Sanderson in the chair, and S. H. Seamans Secretary. Mr. F. B. Mills, Assistant Secretary of the Millers' National Association, was also present, and the UNITED STATES MILLER, *The Northwestern Miller*, of Minneapolis, and the *Sentinel*, of Milwaukee, had reporters present.

The members in attendance were J. A. and D. L. Kimberly, of Neenah; S. R. Willy, of Appleton; Frank Holt, North Lake; S. E. Crawford, Ripon; J. S. Mahning, Columbus; Edward Schraudenbach, Okauchee; Walter S. Green, Milford; A. Crowfoot, Hartford; Jehn Schuette, Manitowoc; James Norris, Stoughton; Otto Puhlman, Plymouth; Edward Sanderson, S. H. Seamans, Herman Nunnemacher, F. Schlesinger, C. Manegold and others of Milwaukee.

Edward Sanderson, Esq., president of the Association, having called the attention of the members, announced that this was the first regular meeting under the new constitution adopted six months ago. The millers of the state, as well as he, knew the benefits derived from an organization such as they had formed. It improved the members socially and morally, and better enabled them to protect their interests against unwarranted inroads. That "in union is strength" had its bearing in the occupation of milling as well as in more momentous affairs. By the social intercourse of the members and by the discussion of improvements great good is obtained, and the more the association is cultivated, the better for all. President Sanderson's remarks were happily conceived and heartily appreciated.

The secretary and treasurer, Mr. S. H. Seamans, reported in his capacity as treasurer. At the previous semi-annual meeting there was on hand a balance of \$717.84, which with the receipts since that time swelled the sum to \$885.84. The disbursements had aggregated \$2,486.30, leaving in hand, at date, a balance of \$599.04, or rather \$699.04, since he had collected \$100 just before the meeting opened.

Mr. Seamans, on the acceptance of the exhibit, then reported as follows, in his capacity as secretary:

MR. PRESIDENT—Since our last meeting, in June, 1879, when we adopted our present constitution, we have added to our membership six firms operating 21½ runs of buhrs, all but one of which were new mills. There have formally withdrawn three firms covering five runs of buhrs. The delinquents on assessments are as follows:

| On assessment No. 4. | Runs. |
|----------------------|-------|
| " " No. 5. | 13 |
| " " No. 6. | 38 |
| " " No. 7. | 111 |

A small portion of No. 5 and a larger portion of No. 6 will probably be paid. The following are the number of runs in which assessments have been paid since the organization of the association, in October, 1878:

| On first assessment. | Runs. | Per Run. |
|----------------------|-------|----------|
| " " " " | 423 | 5.00 |
| " " " " | 409 | 6.00 |
| " " " " | 408½ | 10.00 |
| " " " " | 424 | 10.00 |
| " " " " | 403 | 5.00 |
| " " " " | 339 | 5.00 |

The call of the National Association at their last meeting was for \$10 per run from the several state associations, but, owing to advance payments of our state, it was only necessary for us to levy an assessment of \$5 per run to meet the call to the present time. Our assessments have only amounted to \$40 per run of stone represented in the Association. When we consider that this covers the expenses of the original suit against G. T. Smith, the great Cochrane suits, and the Denchfield, either of which demands was from two to five times what we have thus far paid, beside preventing many other claims which would undoubtedly have been brought against us, we have reason to congratulate ourselves that so

MUCH HAS BEEN SAVED by organized effort. Those that have kept aloof from the organization on account of economy or meanness, perhaps both, are now

enjoying the blessed privilege of settling their claims for the brush at \$100 per machine, twenty-six having, as I am creditably informed, settled upon that basis; and every one is to be invited to settle and must pay or stand suit. So says the missionary who is looking after these outsiders.

The Denchfield suits are still being ground out through the slow process of the courts, and are confined to New York and Illinois. The original case in New York, that of Harvey vs. Gage, has gone to the United States Supreme Court.

There are also seven other cases, known as the "default" cases, still pending in Rochester, N. Y., the complainants allowing them to remain quiet, no move having been made toward assessing damages; nor is there any probability that anything more will be done in those cases. There are, however, seven other suits upon which active work is being done, and which will probably come up in May. Mr. Geo. B. Selden, patent attorney of Rochester, N. Y., has given almost his entire time to the taking of testimony in these cases, while all that is being done is under the direction of Mr. Harding, attorney for the National Association. The principal defense in these suits are the French inventions of Cartier and the English invention of Robinson, neither of which were used in the "default" cases. Working machines of these inventions have been made and put to running in some of the mills in Rochester and have been found to completely anticipate the claims of Denchfield. These suits have taken much time and required a large outlay. They will probably come before the Court in May, and if not, they will go over to the September term. I am informed that since the expiration of the Denchfield patent none of the Rochester mills have gone back to the use of the device. The "Curb Sections," on a comparative trial, having proved much more economical and effective. Whatever the results of the suits may be, Mr. Harding affirms positively that the complainant can never assess any damages, even if they should get a decree of infringement. Success on our part in these cases seems to be a foregone conclusion.

It would seem that the only way for these complainants to make any money is to bleed the unprotected "outsiders." I am also informed that the Cochrane fraud, is to be again brought to the front, and that a suit will be commenced at the next term of the court in June, at Canadaigua, N. Y.

The first exhibition under the auspices of the National Association to be held in Cincinnati the first half of June bids fair to be much more successful than our most sanguine expectations. A letter of a late date from President Bain states that all the available space is taken and that many exhibitors who were very indifferent at the outset in regard to exhibiting their wares are now urgently begging for space. The exhibition will embrace six engines each of 200 horse power; seven complete mills in successful operation, and over 1000 different machines in motion, besides extensive displays of grain and products of the soil by boards of trade, states and railroads. Missouri, Kansas, Iowa and Minnesota have already taken an active part to have their products fully represented, and I trust that this organization, in conjunction with the Chamber of Commerce of this city, will take such action that our state shall be fully represented at the first great International Exhibition, knowing that our productions will compare favorably with any other country in the world.

Passage arrangements have been made with the steamship lines out of New York at such rates to and from European cities as will ensure a very large attendance from abroad. One party, of which we have notice, consisting of forty flour and grain merchants, will sail from London. Other parties are also made up at Glasgow, Liverpool and other important cities of Europe, who are all taking the opportunity to visit this country. No man interested in flour and grain should fail to visit this exhibition.

THE MUTUAL INSURANCE PROJECT.

After a discussion on the best means to collect the assessments due the Association, reports of Committees were called for, wherein Mr. John Schuette, of the Special Committee on the project of a State Millers' Mutual Insurance Company, reported at some length. He declared he felt some hesitation in urging the measure, though he favored an organization of the kind for the general good, thinking it concerned every member as well as himself and that he was only their delegate in shaping the plan. He had circulated pamphlet copies of the prospectus and had received replies, all except one of which were favorable to the project. The feasibility of an insurance company of the kind and its advantages were doubtless apparent to most of the members. The articles of incorporation required nine signatures, which would doubtless be appended during the session. The new company could then formally organize by the election of officers. That success would attend an organization of the kind, he was assured, if the business is but conducted in a reasonable manner. If one-half of the mill owners of the State would co-operate to this end, the new association would commence under very favorable auspices. Mr. Schuette read the following sections of the draft for

by-laws for the sake of acquainting all with the conditions of the insurance:

Sec. 4. The first 25 policies issued shall each be for \$1,000 insurance.

Thereafter any one risk may be increased \$500 for every \$10,000 additional risk taken.

Sec. 5. All policies shall be issued for five years, and all policies shall take effect at 12 M. of the date of issue, and remain in force until its holder ceases to be a member of the company.

Sec. 6. Each applicant for insurance must give his premium note for the amount of his five years premium, and pay 10 per cent of the note in cash at the time the policy is delivered to him, which amount will be endorsed on said note and credited against said note on the books of the company.

Mr. Schuette thought it might be advantageous to begin with more than 25 policies.

Mr. J. A. Kimberly, of Neenah, had read the pamphlet and deemed the plan feasible.

Mr. Schuette further explained the plan to be the same as that of the Millers' National Company, and that of the Manufacturers' Company. Mr. Willy, of Appleton, to obtain the sense of the Association, moved that a company of the kind be formed. The vote was in favor of the project.

Mr. Sanderson favored the plan and would take shares in the company to the amount of from \$1,000 to \$5,000. An organization of the kind would keep down premiums in general. A friend from the country had asked him about the wisdom of placing his entire insurance in the Millers' National Insurance Co. He had replied it would not be wise to place the eggs all in one basket. His advice then was to place the insurance in several companies. This scattering would tend to reduce the premiums.

The expense of maintaining an organization of the kind in view was discussed.

Mr. Willy suggested that the organization of the new company be delegated to Mr. Schuette, which was generally concurred in. Mr. Sanderson remarked that the gentleman could readily secure nine signatures to the articles of incorporation and begin with insurance on fifty mills.

Mr. Seaman said of the National Exhibition by the millers that it should be decided whether the State Association should be represented by a delegation or whether the attendance should be individual. Mr. Sanderson was of the opinion that it would prove far more convenient and agreeable to engage rooms in Cincinnati to serve as headquarters.

The Executive Committee were instructed to engage rooms for a period of one week.

Mr. Sanderson, on the proposition to place samples of grain of Wisconsin on exhibition, informed the members that the Board of Directors of the Chamber of Commerce had considered an exhibit in behalf of the city and referred the subject to their Grain Committee.

Mr. Kimberly thought an exhibit by the Chamber of Commerce would be an exhibit for the State.

The question of railway transportation was also discussed. Both this and the grain exhibit were referred to Mr. S. H. Seamans, who was authorized to act for the Association in those important particulars.

ELECTION OF OFFICERS.

The election of officers new took place, and with this result:

President—Edward Sanderson, Milwaukee. Vice Presidents—S. R. Willy, Appleton, and J. Hegdson, of Janesville.

Secretary and Treasurer—S. H. Seamans, Milwaukee.

Member of the National Executive Committee—S. H. Seamans, Milwaukee.

Executive Committee—J. A. Kimberly, Neenah, Walter S. Green, Milford and C. A. Manegold, Milwaukee.

When Mr. Sanderson was re-nominated, he remarked that this was pursuing "the old groove." Mr. Kimberly replied that they had found that "groove" a good one for the Association. Mr. Sanderson thanked the members for the compliment of a re-election.

The President inquired for information about the wheat crop in hand. Some Eastern speculators, who were wise above what is written, had advanced estimates which were really extraordinary. Various of the members reported, and from their statements it appeared that about 5,000,000 of bushels remained in store, after seeding, or about one-quarter of the crop of the past season. The gentleman from Stoughton said fully 40 per cent remained in store in his section.

About the winter wheat crop it was developed that it was not up to the average of past seasons.

It was observed in the latter connection that drill seeding, instead of broadcast seeding, had effected an extraordinary improvement in the yield, as the wheat so sown was not so likely to be winter-killed.

On a matter that would be discussed in the convention of the National Association, namely, that of forming a basis of assessment on runs of stones and sets of rollers that would be equitable, an expression of opinion was requested for the information of the State Representative in that body. The opinion seemed to be that a double roller mill equalled a run of stone.

After thanking landlord Antidel for the use of the parlors of his hotel, the Association closed its session, to meet again April, 1881, unless sooner called.

NEWS.

EVERYBODY READS THIS.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

J. Richmond, of Mattoon, Ill., is putting in rolls.

A steam flour mill is to be built at Anton, Dakota.

The Aetna flour mill recently burned is to be rebuilt.

James Yowell is building a two-run mill near Waco, Tex.

Lane & Webb, of Rio, Ky., are building a two-run water mill.

Robt. Denny is making some additions to his mill at Smyrna, Del.

Covey Bros., of Nebo, Ark., are building a two-run custom mill.

Austin, Buck & Co., are building a 3-run mill at Hillsboro, Ohio.

G. S. Stark has just completed his 3-run mill building at Carrolton, Ky.

Conrad Schneider, of Scribner, Neb., is building a two-run water-mill.

Hougaard & Co., of Manti, Utah, are putting in flouring mill machinery.

Willis Whipple is remodeling his mill at Deerfield, Ind., for new process.

Rabbeth, Brownell & Co., of Hopkinsville, Ky., is putting in new burrs and fixtures.

Gano & Spinning now have their fine four-run mill in operation at Gano Station, O.

T. Y. Conner is adding two run of burrs, elevators, etc., to his mill at Tuskegee, Ala.

A stock company is about to build a mill on the Jonathan Mills system, at Denver, Colo.

Lindsay, Glaze & Co., Madison Mills, O., have contracted for a three-run mill complete.

Phillips & Simons's mills at Money Creek, Minn., were recently damaged by high water.

T. J. C. Sparks & Sons, of White Lick, Ind., have contracted for a two-run mill outfit.

Many of Kurth's Cackle Separators have been shipped to Europe during the past month.

J. H. Debolt, East Riverside, Pa., is adding some of the latest improved machines to his mill.

The Eagle Mills, Milwaukee, are putting in some more of Gray's patent noiseless roller mills.

H. C. Cole, of Chester, Ill., has ordered rolls from the Milwaukee firm of E. P. Allis & Co.

R. Rustin, of Evansville, Ind., is putting in the Gray's patent noiseless rolls for cleaning bran.

John Hamilton, of Loveland, Iowa, has ordered rolls from E. P. Allis & Co., Milwaukee.

Five hundred barrels of flour were recently shipped from Richmond, Ind., to the East Indies.

Shawes, Elliott & Bullington, of Dexter, Kan., have ordered a three-run water mill outfit.

Peebles, Foulds & Co. have completed their model six-run "Race street" Mills, in Cincinnati, O.

At the meeting of the Missouri Millers' Association, April 18th, the old officers were re-elected.

Taylor & Wengler, of Hartford, Kan., are adding new burrs and a large amount of other machinery.

Ed. C. Goodrich, miller, lately at Jewett's Mills, St. Croix Co., Wis., has moved to Stillwater, Minn.

Simpson & Gault have completed the finest 4-run steam mill in Kentucky, at Versailles, for E. D. Hix.

John Kolner, formerly of Milwaukee, is now the head miller in Colman's mill at Winnebago City, Minn.

Simpson & Gault are furnishing the Kene-saw Mill Co., Marietta, Ga., a No. 3 roller snow flake purifier.

Smith Bros., of Milwaukee, Wis., are making plans for the new woolen mill at Grafton, Ozaukee County, Wis.

A new mill is being built at Nevin, Ill., by Lycan & Co., driven by steam, and having all the late improvements.

Smith Bros., of Milwaukee, are making plans for a new four-run flour mill for Mr. D. Ropke, Manitowoc, Wis.

The Cackle Separator Mfg. Co., has opened an agency for Austria, at Vienna, Austria, and expect a lively trade there.

E. P. Allis & Co., Milwaukee, have an order for ten more of Wegmann's patent porcelain roller mills from C. C. Washburn.

The Joliet Steel Works have ordered a pair of large Reynolds-Corliss blowing engines from E. P. Allis & Co., Milwaukee.

Swearingen & Follett, of Sherbourne, Minn., are building a four-run new process mill, driven by a 50-horse power engine.

The capacity of the new Queen Bee Mill at Sioux Falls, Iowa, is to be 500 barrels per day. It will be completed about harvest time.

Cook & Abbott's mill at Lockport, Vigo

Co., Ind., was burned April 8, by an incendiary. Loss, \$18,000; insurance, \$8,000.

Peter Mann, of New Albany, Ind., is putting in porcelain and grooved roller mills, ordered from E. P. Allis & Co., Milwaukee.

Owing to the wet and cold weather but very little wheat has been sown yet in Outagamie County. We hope for better weather soon.

The Empire Mills, of Milwaukee, have recently partially changed ownership. The name of the present firm is S. H. Seamans & Co.

Smith Bros., of Milwaukee, are putting up a large quantity of pearl barley machinery for Mr. S. Pieron, on River street, Milwaukee, Wis.

Smith Bros., of Milwaukee, have made plans for a new three-run custom mill for William Brunner at Oak Creek, Milwaukee County, Wis.

E. P. Allis & Co., Milwaukee, Wis., have a large order from the Yager Milling Co., of St. Louis, for their celebrated noiseless roller mills.

J. M. Boyd & Son have purchased one of Simpson & Gault's dustless gladiator shellers and other machinery for their mill at Hillsboro, Ohio.

George R. Gale, of Cleveland, Ohio, has contracted to erect a four-run mill for W. F. Fry, at Burgoon, Ohio, which will be a first-class job in every respect.

Croswell, Mich., is going to have a tip-top four-run new process flouring mill. Thomson & Stuart, the proprietors, have the reputation of being very energetic men.

Mr. A. Vurn & Wagner are just ready to commence the erection of a three-run grist-mill at Kaukauna, Outagamie Co., Wis.; they have excellent water power.

Smith Bros., the Milwaukee millwrights, are putting in new bolting, chests and other machinery in the flour mills of Messrs. Albrecht & Co., at Newburg, Wis.

The Cackle Separator Mfg. Co., of Milwaukee, Wis., have received an order from Vienna, Austria, for one of their largest size machines, for one of the largest mills there.

White & Listman's mill at La Crosse, Wis., has been fitted up on the Jonathan mills system of reduction and has recently started up. Work is said to be quite satisfactory.

Pfeffer & Traudt, of Mount Vernon, Ind., are putting in iron husks, bolts, and a general supply of improved machinery, so as to bring their mill up to the highest standard.

The Cackle Separator Mfg. Co., of Milwaukee, Wis., have sent a machine to Nashville, Tenn., to be exhibited at the Centennial Exhibition held there during this month.

April 4th the high water carried out the dam of J. D. Simon's mill at Colfax, Wis., and damaged the foundations of the mill so badly that it will take a long time to repair it.

Mr. Millen Graham, of Oil City, Wis., has quit the milling business. He is succeeded by Messrs. Sewell, Fullmer & Delap. The mill is a two-run mill and is driven by water power.

It is said that A. A. Freeman's mill at La Crosse, Wis., is to be enlarged and changed to the Hungarian system this season. It will have a capacity of about 600 barrels per day.

The Reliance Flouring Mills at Sheboygan Falls, Wis., leased by H. Reysen, was struck by lightning on the morning of April 24, and totally destroyed. Loss, \$10,000; insurance, \$7,000.

The Excelsior and Northwestern Mills, of Minneapolis, have just started up under the new gradual reduction roller system after being fitted up entirely by E. P. Allis & Co., Milwaukee.

Mr. Guyon Fisher, a miller near Kalamazoo, Mich., was recently killed by a gun shot while out hunting. It is supposed the gun was accidentally discharged while he was pulling it over a fence.

George R. Gale, of Cleveland, Ohio, the well-known mill furnisher, reports business good in his section. He is working on full time. The Ohio millers are looking forward to good times.

Robert Laurie, of Chatham, Ont., Can., a prominent mill owner and grain dealer, died April 14, 1880. His death was caused by the severe burns sustained by the explosion of a kerosene lamp.

A \$100 counterfeit note on the Pittsburgh National Bank of Commerce is in circulation. The Chief of Experts at Washington says that it is the most dangerous that has appeared for seven years past.

A party is going to build a flouring mill at Breckenridge, Minn., this summer to accommodate that locality, at which the people thereabouts rejoice, for they have needed a mill a good while.

White Bros., of Hokah, Minn., are changing one of their mills at that place into the roller system to suit the demand of the times. Messrs. Sorrenson & Dawson are doing the mechanical part of it.

George R. Gale, proprietor of the Hayward Mill Furnishing Works, of Cleveland, Ohio, has just taken a contract for general overhauling and repairing for the Starke Milling Co. at Canton, Ohio.

Wm. F. Kruger has rented his mill at Hingham, Wis., to Josiah Lauret, and has bought the Mill Rock Flouring Mills from James H. Craig, at Baldwin, Jackson Co., Iowa, where he will reside hereafter.

Wisconsin and Minnesota millers are taking a good deal of interest in the mutual insurance

business. It seems quite probable that mutual companies will be organized in both of these states during the present year.

The floods of April 4th carried out the dam of Wm. Wilson's mill, 12 miles west of Eau Claire, Wis. The dam was built last May. His new mill escaped without injury, but the dam will have to be entirely rebuilt.

A five-run new process mill is being built at Owensboro, Ky. It is the purpose of the proprietors, Messrs. W. J. & L. Lumpkin, to make this the leading mill in Kentucky. A 14-inch Atlas engine will be used to drive the mill.

Messrs. Stanford, Logan & Co., of Black Earth, Wis., merchants and millers met with a serious loss April 11. Burglars blew the safe open and set fire to their store. Loss, \$10,000; insurance, \$5,000. Their mill was not injured.

Nordyke & Marmon Co., of Indianapolis, Ind., are getting out the machinery for a four-run new process mill, to be built at Missouri Valley, Iowa, by S. T. Berkeley. This will take the place of the mill destroyed by fire about a year ago.

E. J. Bunch has completed his fine elevator building at New Madison, Ohio, and is now arranging his machinery consisting in part of engine and boiler, five stands of elevators, corn cleaners, corn sheller, a wagon scale, wagon dump, etc.

The Star Flour Mills, owned by John Fairclough at St. Joseph, Mo., were burned on the evening of April 28. Loss, \$10,000; no insurance. F. L. Somer & Co.'s cracker factory adjoining was also burned. Loss about \$10,000; loss nearly covered by insurance.

The Hayward Mill-Furnishing Works of Cleveland, Ohio, of which George R. Gale is proprietor, has received the order for a complete outfit for the Marshallville Milling Co., of Marshallville, Ohio. They are to have a five-run new process mill with the latest modern improvements.

The new Standard Mills, of E. V. White & Co., Minneapolis, have decided to change over to the gradual reduction roller system, and have given contract to E. P. Allis & Co., of Milwaukee, who built their mill. The order includes a large number of Gray's patent noiseless grooved roller mills.

Messrs. Gilbert, Waugh & Co., are the proprietors of the City Mills at Mansfield, Ohio. Their mill has five run of stone, is driven by a 70 horse power steam engine, and turns out about 100 barrels of flour daily. The firm are about to erect a new mill adjoining their present one, the plans for which are new about completed.

Messrs. Hicks, Brown & Co., of Mansfield, Ohio, have a fine 8 run, steam power flouring mill. Two more runs of stone will be added this season. The power is furnished by a 118 horse power Harris-Corliss engine. The mill is thoroughly equipped with the best modern milling machinery, and at present turns out about 200 barrels per day, much of which is exported.

E. P. Allis & Co., of Milwaukee, Wis., report business good. They are running day and night with a force of about 700 men. Their specialties are the Reynold's-Corliss engine, Reynold's patent independent condenser, and Reynold's feed water heater; Gray's patent noiseless roller mills, with both plain and grooved chilled iron rolls; Wegmann's patent porcelain roller mills, French burr millstones, and general mill machinery and furnishings.

Among sales made by the Cackle Separator Mfg. Co., of Milwaukee, Wis., during the past two weeks, are the following: Quaker Mill Co., Ravenna, Ohio; Ashford & Buffington, Fort Worth, Texas; Queen City Mill Co., Buffalo, N. Y.; Hardesty Bros., Columbus, Ohio; G. & W. Todd & Co., St. Louis, Mo.; J. P. Dale & Co., Nashville, Tenn.; J. Wurster, Milwaukee, Wis.; W. E. Merkle, Lebanon, Ky.; F. W. Haveland, Trimble, Wis.; J. C. Wright, Copenhagen, N. Y.; O. B. Boody, Kirkhaven, Minn.; J. K. Mullen & Co., Denver, Colo.; O. R. Davis, Denver, Colo.; Davenport Oat Meal Mill Co., Davenport, Iowa; J. Pedeson, Ettrick, Wis.

The following firms are adding new burrs, bolts and cleaning machinery, furnished by Nordyke & Marmon Co., of Indianapolis, Ind.; Mitchell & Mathews, Grantham's Landing, Ala.; L. D. Lusk, Guntersville, Ala.; H. H. Montman, Colburn, Ind.; A. G. Mellis, Morristown, Ind.; A. Gardner, West Jordan, Utah; S. P. Allison, Clarksville, Tenn.; Cooper & McKeen, Martinsville, Ill.; Carey Culow, Longmont, Col.; Church & Co., Knightstown, Ind.; James McFall, Shelbyville, Ind.; G. W. Ennis & Co., Carrollton, Mo.; Shaw & Wood, Parker, Ind.; R. B. McGahey, Dun, Kan.; Knowles, Jones & Co., Randolph, Wis.; Thomas Annis, Athens, Ga.; Thomas Mulcahy, Prophetstown, Ill.

Our Book Department.

For the convenience of our readers, we have made arrangements with publishers so that we can furnish any of the following works, postpaid, on receipt of price. All remittances must be made by post-office money order, draft on New York or Chicago, or by registered letter. For sums of less than \$1 postage stamps will be taken. Address all orders to

E. HARRISON CAWKER,
Publisher United States Miller,
Milwaukee, Wis.

CRAIK.—The Practical American Millwright and Miller. By DAVID CRAIK, Millwright. Illustrated by numerous wood engravings, and two folding plates. 8vo, \$5.

CONTENTS.—Part I. Introduction.—Chapter I. Mechanical Powers. The Lever, The Inclined Plane, The Wedge, The Screw, The Pulley and Cord, The Crank, II. Fly and Balance Wheels. Centrifugal Force and

Circular Motion, Action and Reaction, Friction. III. Transmission and Transportation of Motive Power. IV. Peculiarities and Properties of Pressure of Water, Taking Levels, Fitting Down Sills Under Water, Pressure of Water, Velocity of Falling Water, Tables of Velocity of Water and Quantity Discharged, Measuring a Stream of Water, Table of the Quantity of Water Passing Over a Weir. Part II. Water Wheels. V. The Undershot. VI. The Overshot. VII. Experiments with Wheels, Barker's Wheel. VIII. Centrifugal Discharge Wheels. IX. Spiral Discharge Wheels, The Rose Wheel. X. Spiral Screw or Flood Wheels. XI. Mill-Dams. Part III.—Saw Mills. XII. The English Gate. XIII. The Mulley Saw. XIV. The Gang. XV. The Circular Saw-Mill, The Edging Circular, Table of Logs Reduced to Inch-board Measure. Part IV. Grist Mills. XVI. Planning, Gearing, Belt Gearing, Gearing Overshots, The Building, The Husk Timbers, etc., The Bridge Trees, The Step, The Spindle, The Bed-Stone, The Driver, The Damsel, The Boxes, The Bushes, The Curb, The Hopper, Shoes, Mill Stones, Burr Stones, Truing the Stones, Draught, Dressing the Stones, The Quarter, The Slick Dress, Balancing the Runner, Bolts, Bolt Chests, Bolt Cloth, Smut Machines, Screens, Merchant or Manufacturing Bolts. Part V.—XVII. The Oatmeal Mill, The Kiln, The Process of Drying, Dressing, and Hanging the Stones, Manufacture of Split Peas. XVIII. The Barley Mill. XIX. Wool Carding and Cloth Felling and Dressing, The Tenter Bar, The Shearing Machine, The Cloth Press. XX. Windmills. XXI. Steam Power. Index.

HUGHES.—American Miller and Millwright's Assistant. By WM. CARTER HUGHES. A new edition. In one volume, 12mo, \$1.50.

Among the Contents will be found the following: Introduction.—Explanation of Technical Words. Part I. On the First Principles of Mechanics.—Table of the Surfaces of Solids without Unguents.—Tables of the Results of Experiments on Friction, with Unguents, by M. Morin.—Table of Diameters of First Movers.—Table of Diameters and Circumferences of Circles, Areas, and Side of Equal Squares.—Geometrical Definitions of the Circle and its Parts.—Centre of Percussion and Oscillation. Hydrostatics: Introduction.—On the Upward and Downward Pressure of Water.—Specific Gravity.—Table of Specific Gravities.—Hydrodynamic Power of Water-wheels.—On the Action and Reaction of Water, as applied to Water-wheels.—On the Construction of the Combination Reaction Water-wheel.—Table of Velocities of Water-wheels per minute, with Heads of from four to thirty feet.—Table of the Number of Inches of Water Necessary to Drive one Run of Stone for Grist or Saw-mills on Heads of four to thirty feet.—Table showing the Required Length of Overshot and Breast-wheels on Heads of ten to thirty feet.—Table showing the Velocity of Water. Part II.—Practical Milling and Millwrighting.

PALETTE.—The Miller's, Millwright's and Engineer's Guide. By HENRY PALETTE. Illustrated. In one vol. 12mo., \$3.

LEFFEL.—The Construction of Mill-Dams: Comprising also the building of Race and Reservoir Embankments and Head Gates, the measurement of streams, gauging of water supply, etc. By JAMES LEFFEL & Co. Illustrated by 58 engravings. 1 vol. 8vo., \$2.50.

LARDNER.—The Steam Engine: For the use of Beginners. By Dr. LARDNER. Illustrated. 12mo, 75 cents.

TEMPLETON.—The Practical Examiner on Steam and the Steam Engine: With Instructive References relative thereto, arranged for the use of Engineers, Students, and others. By Wm. TEMPLETON, Engineer. 12mo, \$1.25.

BOURNE.—Recent Improvements in the Steam Engine: In its various applications to Mines, Mills, Steam Navigation, Railways, and Agriculture. Being a supplement to the "Catechism of the Steam Engine." By JOHN BOURNE, C. E. New Edition. With numerous illustrations. 16mo. Cloth, \$1.50.

BYRNE.—Handbook for the Artisan, Mechanic and Engineer: Comprising the Grinding and Sharpening of Cutting Tools, Abrasive Processes, Lapidary Work, Gem and Glass Engraving, Varnishing and Lacquering, Apparatus, Materials and Processes for Grinding and Polishing, etc. By OLIVER BYRNE. Illustrated by 185 wood engravings. One vol. 8vo., \$5.

EDWARDS.—A Catechism of the Marine Steam Engine, For the use of Engineers, Firemen and Mechanics. A Practical Work for Practical Men. By EMORY EDWARDS, Mechanical Engineer. Illustrated by 60 engravings, including examples of the most modern engines. In one volume, 12mo, \$2.

WATSON.—The Modern Practice of American Machine-sets and Engineers: Including the Construction, Application and Use of Drills, Lathes, Tools, Cutters for Boring Cylinders and Hollow Work Generally, with the most Economical Speed for the same; the Results Verified by Actual Practice at the Lathe, the Vice, and on the Floor, together with Workshop Management, Economy of Manufacture, the Steam Engine, Boilers, Gears, Belting, etc., etc. By EGBERT F. WATSON, late of the "Scientific American." Illustrated by 86 engravings. In one volume, 12mo, \$2.50.

LUKIN.—The Young Mechanic. Practical carpentry, containing directions for the use of all kinds of tools, and for construction of steam engines and mechanical models, including the art of turning in wood and metal. By JOHN LUKIN, author of "The Lathe and Its Uses," etc. Illustrated. 12mo, \$1.75.

LUKIN.—Amongst Machines: Embracing descriptions of the various mechanical appliances used in the manufacture of wood, metal, and other substances. 12mo, \$1.75.

LUKIN.—The Boy Engineers: What They Did, and How They Did It. With 30 plates. 12mo, \$1.75.

WILSON.—A Treatise on Steam Boilers: Their Strength, Construction and Economical Working. By ROBERT WILSON. Illustrated. 12mo, \$2.50.

CONTENTS.—Chapter I. Introductory. II. Strength of Cylinder, Sphere and Flat Surfaces. III. Properties and Character of Boiler Materials. IV. Riveting. V. Welding. VI. Construction of Boilers. VII. Boiler Mountings and Setting. VIII. Incrustation. IX. Wear and Tear. X. Factor of Safety. XI. Testing. XII. Boiler Explosions. XIII. Combustion of Coal. XIV. Smoke Prevention and Firing. XV. Heating Surface. XVI. Boiler Power. XVII. Bursting and Collapsing Pressures of Cylinders.

ROBINSON.—Explosions of Steam Boilers: How they are Caused, and How They May be Prevented. By J. R. ROBINSON, Steam Engineer. 12mo, \$1.25.

CONTENTS.—Explosions Caused by Low Water, by Over-Pressure, by Defects in Materials, etc.; by Scale or Sediment, by Repletion of the Water; by Overheating of the water; How Explosions Caused by Low Water, by Over-Pressure, by Defective Materials, etc.; by Scale and Sediment, by Repletion of the Water, by Overheating of the Water, May be Prevented.

NYSTROM.—A New Treatise on Elements of Mechanics: Establishing Strict Precision in the Meaning of Dynamical Terms: accompanied with an Appendix on Duodenal Arithmetic and Metrology. By JOHN W. NYSTROM, C. E. Illustrated, 8vo, \$4.

MOLESWORTH.—Pocket-Book of Useful Formulae and Memoranda for Civil and Mechanical Engineers. By GUILFORD L. MOLESWORTH, Member of the Institution of Civil Engineers, Chief Resident Engineer of the Ceylon Railway. Second American, from the Tenth London Edition. In one volume, full-bound in pocket-book form, \$2.

ROPP'S COMMERCIAL CALCULATOR: Containing many convenient and valuable Tables, showing the value of Wheat, Corn, Rye, Oats, Barley, Cattle, Hogs, Hay, Coal, Lumber, Merchandise; the simple and compound interest at 6, 7, 8 and 10 per cent.; Measurement of Boards, Scantlings, Timber, Saw Logs, Cisterns, Tanks, Granaries, Corn-Crubs, Wagon Beds, Time Table, Wages Table, etc., etc.; also entirely New and Practical Method of Rapid Calculation. By CHRISTIAN ROPP, Jr. Pocket-book form, cloth, \$1.

MCLEAN.—The Miller's Text-Book. By JAMES MCLEAN, of Glasgow, Scotland. Price, postpaid, 50 cents.

Any other books, either domestic or foreign, that our readers may desire, we shall be pleased to obtain and furnish to them at the lowest rates, postpaid, to any part of the United States or Canada.

Lacroix's and Notbohm Bros.' Improved MIDDLINGS PURIFIER

UNEXCELLED

For Economy, Capacity, Purification and Separation.

No Knockers to jam the shaker and pound through the specks.

No Brushes, No Wipers, No Friction to wear Bolting Cloth.

Built in a more substantial manner than any other Purifier in the market. The easiest to regulate to suit all kinds of work, and no more trouble than a bolt. Patented Double Eccentrics which allow of varying or changing the throw of Shaker.

Patented Arc Circle Hangers cause the traveling of the stock along the Shaker, the Shaker being on a perfect level whereby the capacity is increased over any other machine. The Traveling Air Blast under the sieve is confined in tubes from which it is discharged and impinged upward through the cloth and perfectly cleaning same, while at same time it raises the light material on the sieve, enabling the suction fan above to more readily remove it. Any one seeing this air blast at work would never have a machine with a brush, its merits are evidently far superior to any mode of cleaning the cloth, besides the advantage gained by better purification. We defy any other machine to show as good results. Our double machines originally introduced by us, are especially adapted to medium size mills, one being fully equal to several of any other make, as the entire product of the middlings made by the mill can be purified, the machine being virtually two in one.

Our prices are reduced—we sell first class machines, guaranteeing the title, for \$300, \$350 and \$400.

NOTBOHM BROS., Milwaukee, Wis., U. S. A.

New Process of Cleaning Wheat.



More than 90 per cent of the work is done by action of wheat upon wheat.

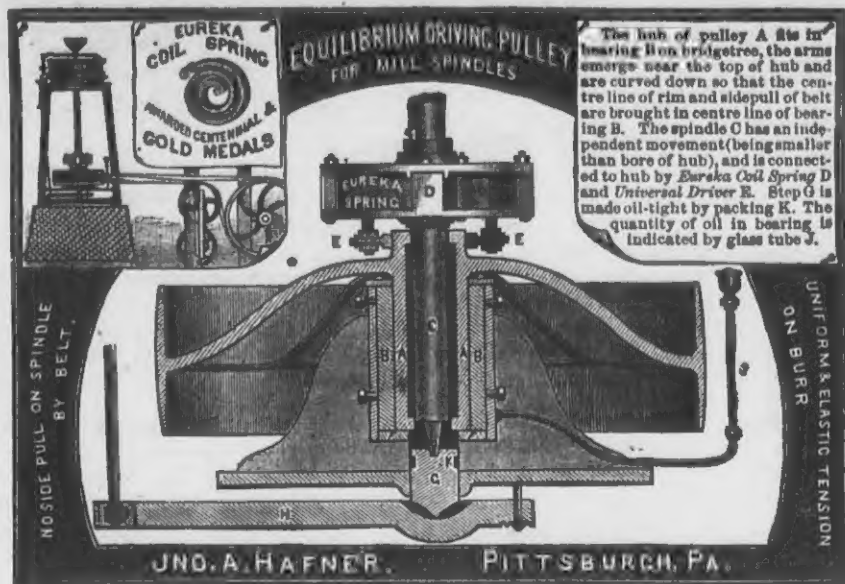
Avoiding all Breakage of Sound Wheat,

Removing Fuzz, Moss and most of the Germs or Chits without cutting, scratching or impairing the Bran Fiber and leaving the wheat smooth and clean. By far the highest order of work ever accomplished. Wheat well cleaned is half milled. No amount of good machinery can make a high grade of flour from improperly cleaned wheat. It is a fatal error to treat wheat harshly, and to impair the bran fiber.

These machines are well built, are very durable, and run very light. They were awarded a diploma and medal at the Centennial Exposition. Also a bronze medal and diploma at the Paris Exposition of 1878, being the highest premium awarded on this class of machinery, also the highest premium at the Minnesota and Michigan State Fairs of 1878. Millers using these machines claim for them the highest degree of merit.

Send for Descriptive Circulars and Price List.

D. M. RICHARDSON, Detroit, Mich.



SCRAP IRON, RAGS, — AND — METALS.

We are in the market for SCRAP IRON, RAGS and METALS, for which we are ready to pay

Highest CASH Prices!

FRANZEN & CO.

WAREHOUSE:

Nos. 1505 and 1507 State St. 80 Onclida St., Opera H.

Milwaukee, - Wisconsin.

Correspondence solicited. Please state where you saw this advertisement. NOV 20

FOR SALE—A Two-run Water Mill, new process machinery, etc., all complete for Custom Mill or Merchant Mill. Plenty of water the year round to run night and day. House, stables, etc. Will be sold cheap on easy time. Address E. W. THOMAS, Lyons, Iowa. apr 21

IMPORTANT NOTICE TO MILLERS.—The Richmond Mill Works and Richmond Mill Furnishing Works are wholly removed to Indianapolis, Ind., with all the former patterns, tools, and machinery, and those of the firm who formerly built up and established the reputation of this house; therefore, to save delay or miscarriage, all letters intended for this concern should be addressed with care to Nordyke & Marmon Co., Indianapolis, Ind.

DESTRUCTIVE TO SCALE! BENEFICIAL TO I ONI

W. F. BRUMMER,

Manufacturer of the Celebrated Lavo

Pat. Boiler Compound,

For Cleaning Steam Boilers,

Office, 49 Onclida St., MILWAUKEE, WIS.

It dissolves and removes scales, leaving the boiler perfectly free from incrustation without injury to the iron.

It prevents the formation of any new scale, and will not foam.

It saves fuel and lessens the danger of explosion.

Any quantity of testimonials can be furnished on application. It is used in the boilers of V. Blatt's brewery, and preferred to any ever before used.

Price 15 cents per pound Discount on large orders.

Millers troubled with BUGS or WORMS in their bolts chests or elsewhere in the mills, should send for a package of my

CAUCASIAN INSECT POWDER.

It is sure death to insects, but absolutely non-poisonous to persons or domestic animals. Price, 25 or 50 cents per package, according to size. Pound packages, \$1.50. my

VIENNA EXHIBITION, 1873, Awarded Diploma of Honor.

PARIS EXHIBITION, 1878, Awarded 2 Gold Medals and 1 Silver Medal.

Announcement Extraordinary.

THROOP'S GRAIN CLEANER CO.

WILL EXHIBIT THE CELEBRATED

GANZ ROLLER MILLS,

THOMPSON'S PATENT SYSTEM OF

I. T. Purifiers and Manifold Purifier, CENTRIFUGAL FLOUR DRESSING MACHINES,

And a large variety of Grain Cleaning Machinery, Smut and Wheat Brush Finishing Machines, at
Cincinnati in June Next.

We take this method of recommending to the American milling public our PATENT ROLLER MILLS with chilled cast iron rollers, for crushing and grinding wheat, which have met with such eminent success in Europe. The mill-owners of AUSTRO-HUNGARY, as well as the prominent millers of Southern Germany, Switzerland and England, have provided for their mills the celebrated GANZ ROLLER MILLS, which are about to supplant entirely grinding on mill-stones, their working being more perfect, producing more white flour, requiring less power than the best mill-stone, and wanting no repairs excepting to occasionally replace a bearing. We have introduced into the art of milling these Roller Mills with chilled cast iron rollers, and from 1874 to January, 1879, we have delivered in the different European countries, Africa and the United States of America about 2,100 mills, and all work satisfactorily. Our crushing mills may now be regarded as absolutely necessary for every well-furnished modern mill, and this is proven by the numerous testimonials at hand. Our grinding mills are remarkable for their absolute discharge bearings, by means of the newly-devised Anti-Friction Pressure Rings. These Rings allow a very high pressure, and hence assure the performance of a great deal of work, avoiding all waste of power caused in other machines by friction in the bearings.

THROOP GRAIN CLEANER CO., Auburn, New York.

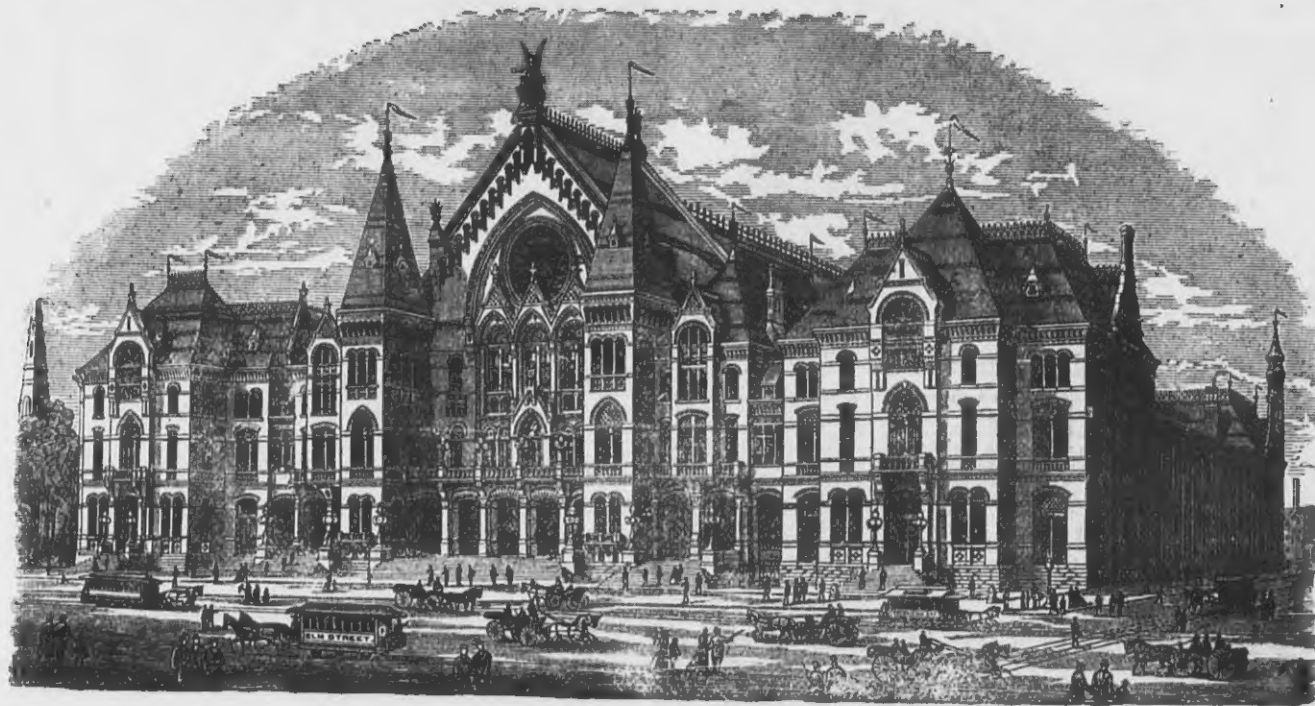
CINCINNATI, 1880.

FIRST GRAND MILLER'S INTERNATIONAL EXHIBITION

— OF —
MILLING, MILL MACHINERY, AND
MILLING PRODUCTS,

— COMMENCING —
MAY 31, AND LASTING FOUR WEEKS.

1880.



1880.

TO BE HELD IN THE
Magnificent Permanent Industrial Exposi-
tion Buildings.

— GIVEN UNDER THE AUSPICES OF THE —
MILLERS' NATIONAL ASSOCIATION,
AND UNDER THE MANAGEMENT OF

A BOARD OF DIRECTORS AT CINCINNATI.
Six 200-Horse Power Automatic Cut-off Engines,

(The largest display ever shown in the world.)

Seven Complete Mill Jobs in Operation,

One Thousand Different Machines in Motion.

Grand Displays of Grain and Products of the Soil by the different Railroads, Boards of Trade, and States. Famous Brands of American and European Flour on Exhibition.

EVERY MAKER OF MILL MACHINERY OF NOTE WILL BE REPRESENTED.

No Miller, Millwright, Flour or Grain Dealer can afford to stay away.

Reduced Railroad Fares. Ample Hotel Accommodations.

For further particulars address

BOARD of EXHIBITION COMMISSIONERS

No. 182 West Fourth Street, Cincinnati, Ohio, U. S. A.